NATURE MAGAZINE

NOVEMBER 1930 35¢ VOL. 16, NO. 5

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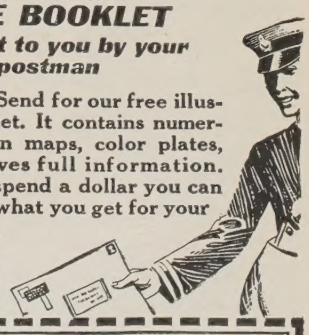

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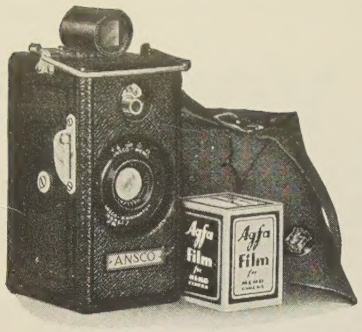

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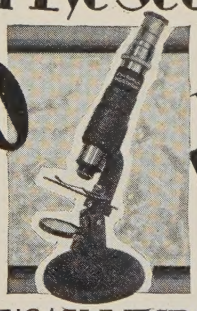

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NATURE NEWS and VIEWS

Park Official Dies

Washington B. Lewis, Assistant Director of the National Park Service, and former superintendent of Yosemite National Park, died at his home in Chevy Chase, Maryland, on August 27. Mr. Lewis had been connected with the Service since 1916, for eleven and a half years in charge at Yosemite, and subsequently, at Washington, at the head of the branch of lands. His last achievement was the successful completion of negotiations for the purchase of the private lands in Yosemite National Park.

Mr. Lewis was connected with the topographic branch of the United States Geological Survey previous to his appointment in the Park Service, and went to Alaska with two National Geographic Society expeditions in 1909 and 1910. The Argentine government secured his services in 1911 to make exploratory surveys in Patagonia. Mr. Lewis also spent some time in mapping in Wyoming, Oregon and Washington.

The death of Mr. Lewis is an irreplaceable loss not only to the Park Service and its officials, but to the lovers of the parks. His untiring devotion to his work and his fund of knowledge of park affairs, particularly those dealing with private lands, made him invaluable. His loyalty and friendliness, his courage in the face of illness, and his remarkable personality drew admiration from all who knew him.

Aid for State Parks

Stimulation of the movement for the establishment of State Parks through the provision of Federal aid on the basis now in vogue for highway development, fire prevention, agricultural education and other activities, is sought in a bill introduced into the United States Senate by Senator Charles L. McNary, of Oregon. Under the bill a Federal Aid Park Commission would be established and appropriations would be made annually to be matched by the States for the establishment of State Park Areas. The bill has the support of the National Conference on State Parks, various park organizations, and is a measure which merits the support of all interested in conservation and recreation.

Forests That Move

Duke Withers, a mountain guide at Jasper National Park, thought that he had dropped back eight centuries to become Macbeth just before his tragic end, when, riding along the moonlit trail between Lac Beauvert and the Athabaska River, he saw what appeared to be a forest moving. Slowly he rode upon the advancing grove of trees. As he neared it, his fears grew and then suddenly were stilled. The moving trees were big poplars, and they were being towed by twin beavers across a road towards the river. Duke felt relieved, realized that he had not suddenly become "bushed", and went on home singing The Cowboy's Lament.

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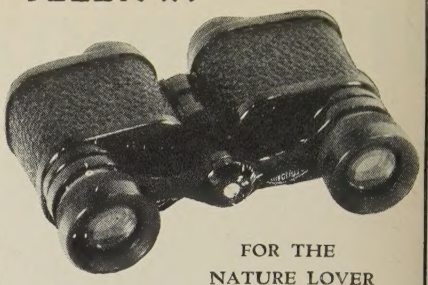

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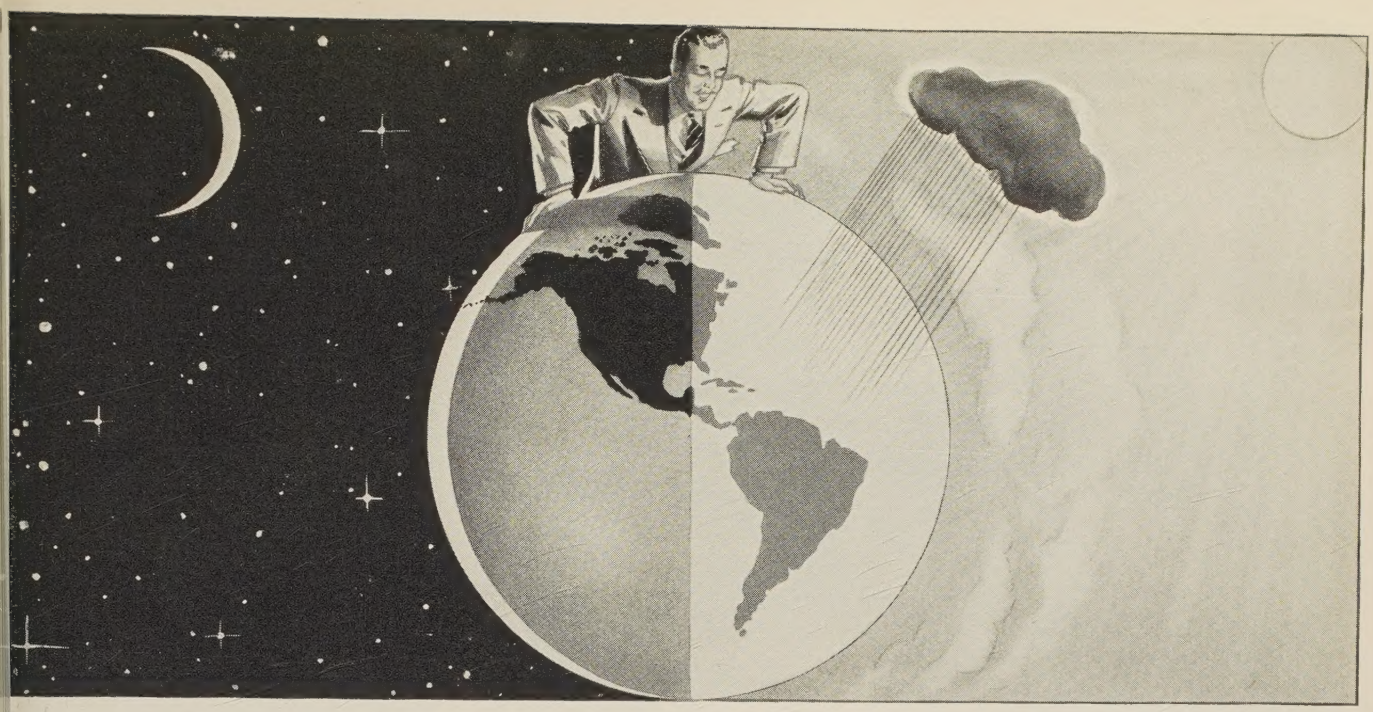

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Give a scientific weather guide, so he can plan for Nature's capricious moods

SHALL he tramp the woods early tomorrow because rain is due in the afternoon? Will the whole day be clear, brilliant and crisp? Do those clouds mean a storm or just a brisk, bracing wind? He wants to know—definitely.

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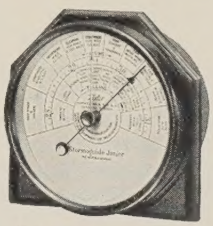

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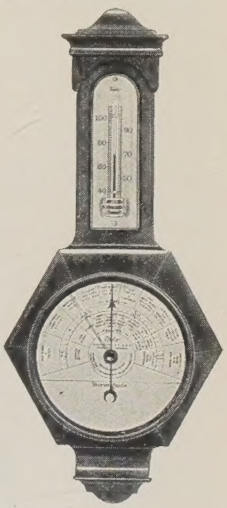

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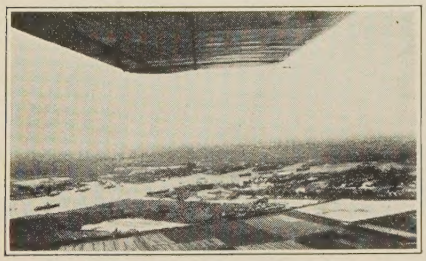
From the Air

The next time you fly take your snapshot or movie camera along to record the adventure in pictures. Best results are, of course, secured when the atmosphere is clear and when the plane is not flying at too great a height over city, country or park.

Naturally not much of interest will be secured of dull expanses of land. Blurry images will be obtained if the camera is permitted to rest on any part of the plane. Care should be taken when using a folding camera to hold it so that the rush of wind will not collapse the bellows.

Use a rapid shutter speed and on a brilliant day stop *f* .22 with the snapshot outfit in open country; stop 16 when swinging reasonably low over congested city districts.

Good pictures are obtainable with ordinary cameras and ordinary film. Panchromatic film and a color filter, however, bring

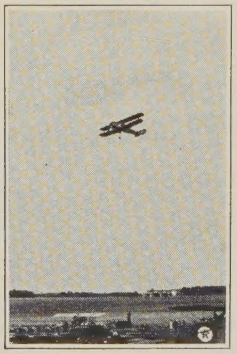


From the Heights 1/100 Second, Stops f .22
Wing of Plane Shows at Top

even better results. Odd effects are obtained when the plane is flying on a "bank."

When photographing other planes going faster than your own it is best to catch them either going away or coming toward you rather than attempting to photograph them traveling directly across the range of vision. When the two are moving at approximately the same rate of speed it is a simple matter to make a snapshot, although the movies won't be so thrilling.

There are also many interesting ground picture chances around the airport itself.



From the Ground

The hangar, planes on the ground and just taking off, obliging pilots, who may let you snap them, and a view of the landing field are among the ground shots that you will want. The writer recently saw an interesting collection of such pictures which were pasted in an album and cleverly titled under each print.

The series carried the caption "At Last We Fly!"

Picture That!

An attempt to photograph thought is being made by two Frenchmen and an Austrian scientist. It is their assumption that when a medium concentrates sufficiently, waves of light go out from the forehead.

Be careful with your thoughts when your partner trumps your ace—he may snapshot those actinic *blue* light waves.

EDITED BY ROBERT T. LOWELL

An Aid to Physical Culture

By Dr. Edwin P. Longaker

The camera in my opinion is really a wonderful aid in the preservation of health. Its greatest value lies in the out-of-doors lure where health abides, with long walks and steep climbs between pictures. And, for building vitality, walking is an exercise that cannot be too highly recommended. There is nothing that can effectively take its place, as the training habits of all athletes clearly demonstrate. No matter what type of event they are training for, athletes always recognize the necessity for a certain amount of walking. It builds vital vigor, adds tremendously to one's endurance, accelerates the circulation of the blood through every part of the body, and strengthens the heart and lungs.

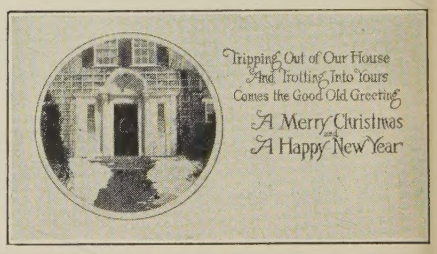
To the average individual, walking is almost a lost art. Transportation facilities have been so perfected in recent years that we do not even consider walking until, in the interest of health, we may be compelled to do so. Then to derive the fullest benefit from walking, we must be given an objective. We must have some interest aside from the fact that we know we ought to do it. To achieve health we must also get *pleasure* from our efforts. We must really enjoy it—it is not enough just to go through the motions. To obtain the ultimate in the benefits of hiking one must *enjoy* it, but there are comparatively few who will set out to do so without having some object in view.

There is where the camera comes in as a guide to the Highway of Health which is not closed at any season but is open the year around. It provides a purpose, leads us off the beaten path and the open road to clamber up hills and over rocks searching for beauty spots to picture and teaches that, as Byron said, "There is a pleasure in the pathless woods." It keeps from our mind the thought that we are just "out taking a walk for the good of our health" and this is a very important factor since, as we are told, all search for health should be unconscious. It would seem that the camera should be the constant companion to the nature lover.

Just The Opposite

To the person who is not cognizant with the reversal system employed in the processing of amateurs' motion picture films but who is familiar with determining the quality of ordinary snapshot negatives, the judging of processed reversal movie film for under-exposure, over-exposure and extreme-contrast might be a bit confusing.

We should remember that just the opposite conditions and appearances prevail in the movie film to ordinary picture making, as the former is processed to bring a *positive* picture image on the actual film that is exposed in the camera—there is no *negative* as in "still" photography. Therefore, if the processed image on a strip of reversal type of film appears heavy, dense, or muddy you will know you under-exposed that portion of film. If the images in a series of frames appear thin, "washy" and lacking in shadow detail, too much light reached the film, and it is over-exposed.



A Truly Personal Greeting Card

Your Greeting Card

It is not too early to think about this year's greeting card if you would make one with the aid of your camera. The photographic-card is one way to produce a greeting message that is distinctively personal. A picture of the doorway of the home—with a Christmas wreath in place—a snapshot group of the family, a picture of the fireplace or of some cosy little nook are but a few of the many suitable subjects.

Perhaps some of your old negatives would do though there is time to make a few from which to choose. If you do not wish to make the completed card, hand the negative to be used to a good photo finisher and tell him about what is wanted.

Should you like to create the entire card yourself write the editor of this page for details.

Subject Moved!

Pets and other subjects that don't like to stand still are usually best photographed unawares. When the dog is loafing in the sun or the horse nibbling at the hedge—that's a good time to snap them.

If the subject moves during the exposure the image will be blurred in the negative and in the print, but other parts of the picture will be sharp. If, however, you know you focused correctly and everything is "fuzzy," the camera must have been wiggled.

Against the Steel Trap

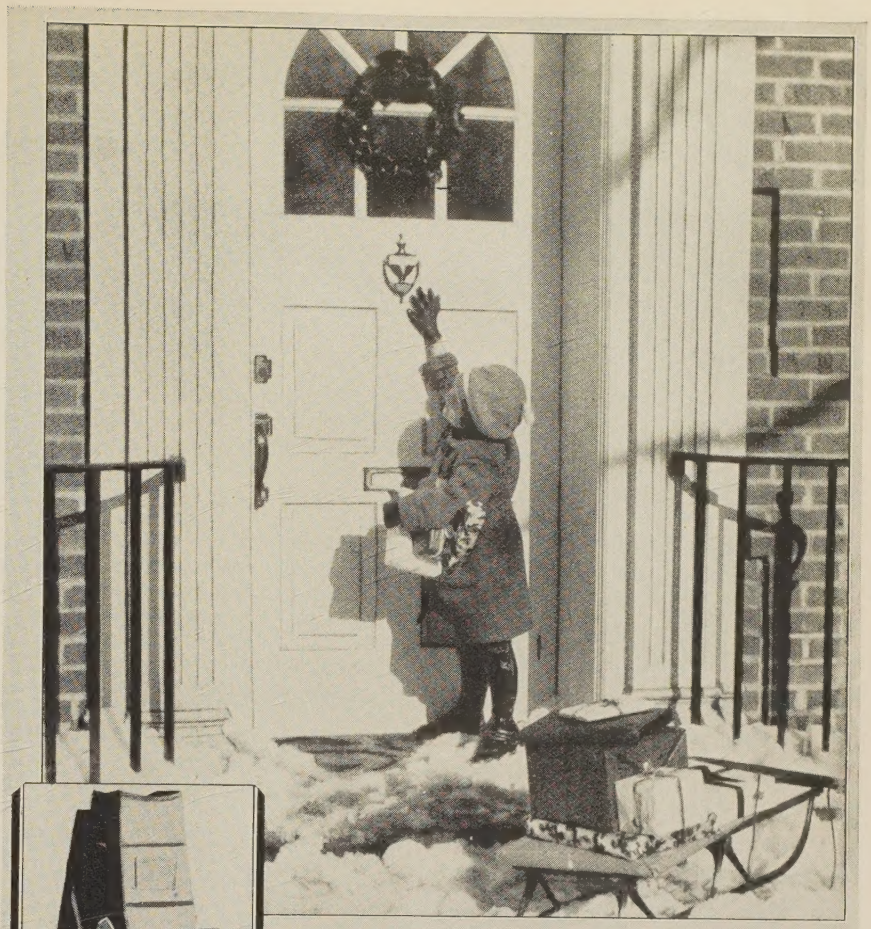
Nature lovers and humanitarians in Massachusetts will get a signal opportunity to end the cruel reign of the steel trap in Massachusetts when they vote in the November elections. A bill abolishing such an instrument of torture will be the subject of referendum, and it is hoped that the strength of true lovers of the wild will overpower all opposition. The measure reads:

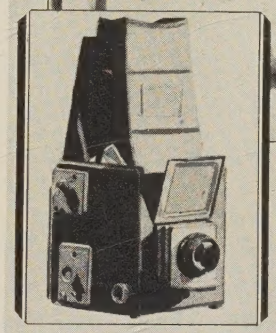
"Whoever uses, sets, or maintains any trap or other device for the capture of fur-bearing animals which is likely to cause continued suffering to an animal caught therein, and which is not designed to kill such animal at once or to take it alive unhurt, shall be fined fifty dollars for each offense; but this section shall not apply to traps or other devices for protection against vermin if set or maintained not more than fifty yards from any building or cultivated plot of land to the use of which the presence of vermin may be detrimental."

The bill is fought by the fur-dealers, naturally, and by a number of misinformed citizens. It is hoped, however, that Massachusetts, the pioneer in so many worth-while movements, will not fail to seize the chance to carry the beacon of progress into a field too long left unlighted.

Zululand Slaughter

Leading American naturalists and Nature organizations, fearing the elimination of important types of animal life in Zululand as a result of wholesale slaughter there in an attempt to crush the dreaded tsetse fly, have cabled and written in strong protest against the warfare that is killing off thousands of carriers of the insects each day. The New York Zoological Society, the California Academy of Scientists, the American Nature Association and kindred organizations are among those urging thorough scientific research before proceeding with the destruction. Endless numbers of mammals, particularly zebra and antelope, have been killed, and the red hartebeest has been practically wiped out. If the reported killing continues, South Africa, the haven of some of the most beautiful animals of the world, bids fair to be a shambles. Most of the protests, such as that cabled by Dr. W. Reid Blair, director of the New York Zoological Park, have asked in the name of humanity for a thorough study to ascertain other ways of controlling the insect plague. Major Frederick R. Burnham, African explorer, in behalf of the California Academy of Sciences, pointed out to the South African authorities that the United States has already suffered from needless slaughter, and that its example should give Africa pause before the killing has gone too far. It is to be hoped that the Union of South Africa will not regard as impertinent the plea of American citizens and organizations in a matter of international importance. Americans have contributed generously to the Society for Preserving the Fauna of the Empire and have viewed with acclaim the establishment of Kruger National Park. They are naturally interested in the most bountiful source of animal life in the world. The earnest pleas of a nation that mourns the passage of much of its most beautiful animal life should not be passed over either as gratuitous or unfriendly.





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NATURE IN PRINT

Matthew Maury

To Matthew Fontaine Maury those who go down to the sea in ships are forever in debt, and the title, *The Pathfinder of the Seas,* which John W. Wayland gives to his biography of this remarkable man is truly descriptive. The life of Matthew Maury was filled with adventure, with pioneering and with lasting achievement. He lived and worked in the days of the development of our country, from 1806 to 1873, and he made himself felt in that period. Mr. Wayland has delved deeply into Maury's life and has put together a biography that is most complete and most illuminating. The inclusion of various excerpts from Maury's writings under the title "Scraps from the Lucky Bag" adds much in interest to the narrative. It is to mean no criticism of Mr. Wayland's work that we express the wish that he had adopted the style of present day biographers with more uniformity. Here and there in the book the author vividly reconstructs the period of Maury's lifetime, but for the most part the background is too lightly etched and the story too conservatively written. It is, nevertheless, a fine biography of the older school and we heartily recommend it. It is published by Garrett and Massie, Richmond, Virginia, and sells for three dollars.

Two Edwards Leaflets

Dr. Charles Lincoln Edwards, director of Nature Study in the Los Angeles Schools, has added two more attractive little Nature Study leaflets to those already published. These last are *The Search for Beauty,* a story of the Sierra, and *José,* a story of the desert cahuilla. They are both written for the youngsters and are, of course, filled with the natural history angle. They are published by the Hesperian Press, Los Angeles.

About Comets

There have been no recent books in English on comets, from the theoretical point of view, at least, and this lack Dr. Charles P. Olivier, Director of the Flower Observatory of the University of Pennsylvania, has filled with his volume entitled *Comets.* The author has written, in terms for both the astronomer and the intelligent lay reader, what he regards as a sequel to earlier books in this field. He has succeeded in presenting a fascinating story of these minor bodies of the Solar System, bodies which are ever of wide popular interest. Dr. Olivier devotes the first part of his book to establishing certain points of history and known facts about comets generally, moving on to the consideration of the specific outstanding comets, with, necessarily, comment upon meteors. It is a most interesting and valuable book for all who are interested in astronomy. The publishers are Williams and Wilkins of Baltimore and the price is $3.50.

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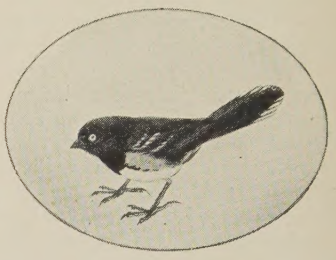

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By R. Bruce Horsfall

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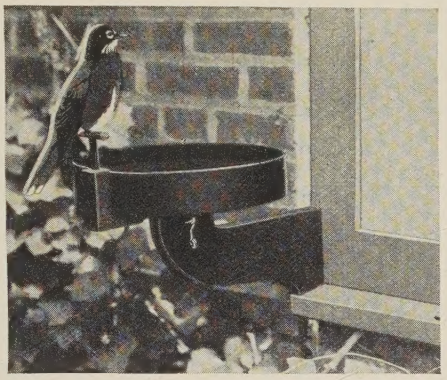

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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THE HUNTING SEASON

An Editorial

As YOU read these lines nearly six and one-half million licensed sportsmen, and we fear several other millions without licenses, are abroad in our land. Their fees brought to the States an aggregate sum of nearly nine and one-half millions of dollars. These figures—which are the 1929 totals but represent well enough the present conditions—indicate an average license fee of about one and one-half dollars.

Those well qualified to judge, and most anxious for us to know, tell us with pride that upwards of two hundred and fifty millions of dollars are expended annually in the pursuit of game. The nine and one-half millions from licenses are expended, theoretically at least, in protecting wild life; the two hundred and fifty millions in destroying it. This statement must be our apology for presenting these figures. It explains why our game and other wild life is decreasing so rapidly.

In many books we read of the recreational, patriotic, health-giving, inspirational and character-building value of hunting. It has the glamor of antiquity. We will admit its hold on the emotions for we have felt its spell. But if it wielded but half the virtue-building power that its devotees claim how could they continue in its practice as they seek each year the fast depleting covers, and measure their declining success by the havoc they have wrought? Suppose their dollar and fifty cents should help to put into the field a Mexican bob-white, or to kill a crow or a hawk, how can that compensate for the fifty or the hundred beautiful and harmless creatures they have killed? Suppose the sportsman's dollar or so is expended on warden's salaries. How much supervision will it represent when spread over a three months' hunting season? And perhaps the warden is himself a hunter, as keen to kill the limit as his charges.

The Federal Government bears the brunt of enforcing the migratory bird law, one of the most beneficent of all conservative measures. It has for this work about one warden to each two states. One of our states, New York, has more than 600,000 licensed hunters. Five other states have more than 300,000 each. What is the measure of the success of one warden? But remember this—if hunting engendered only one virtue, self-respect, there would be need for not a single warden in all our land.

Now there is nothing new in these paragraphs. The facts are all well-known; you may read most of them, between the lines, in any book on sport, and in thousands of articles and advertisements in a hundred magazines. Many remedies have been suggested but most of them are predicated on a fallacy. This is, that because the hunters are yearly increasing in number, that necessarily this increase must continue. A few persons prominent in present day conservation circles have even urged that more people should become hunters. Such a plan is like sweet music to those who get a share of the $250,000,000 that is spent by sportsmen. Let the motives of such conservationists be severely scrutinized by all lovers of our wild life.

When the conditions responsible for any habit undergo a radical change the habit is abandoned. We no longer shoot live passenger pigeons at the traps, and we have about stopped using other live birds for this purpose. The side-hunts of other days are no more. As all our larger beautiful species, game and non-game, grow scarcer, and in some cases are facing extermination, we believe that the custom of using them as targets is becoming more and more repugnant to clear-thinking people. We are learning that recreation may be obtained without killing the wild creatures we see, and that a picture is worth more than the memory of a crumpled body. A few million dollars expended in cameras and films will yield us greater returns in health and pleasure than if spent for guns and ammunition.

But, if this be so, why are the hunters increasing? The answer is given, albeit unconsciously, in the mass of literature on sport that is daily given us to swallow. It is the power of the $250,000,000.

One statement that misleads thousands is that the sportsman has earned the right to take each year the natural increase of the game species. If this be conceded, is the promise not implied that when the kill of any species exceeds this amount, its shooting be stopped? Ask any hunter what species now yields as its toll only the annual increase.

Will the Nature lovers of America let the grouse and the woodcock and the bobwhite be hunted to extermination even with the promise of gaining the pheasant and the Hungarian partridge? For this, briefly and baldly stated, is the tendency.

There have died, within the year, a number of well-known lovers of our wild life who by their lives and writings honored themselves and the cause they loved. In the minds and hearts of millions they still live. Compare the value of their lives with the influence of those whose chief bid to fame is the fact that during the active years of a long life they could each season boast of their hundreds or thousands of birds or other creatures slaughtered in the name of sport. Is it better to be a preserver, or a killer?

"THREE TIMES THE BIG CAT GROWLED
IN THE THICKET BELOW ME"

NATURE MAGAZINE
VOLUME 16 NOVEMBER · 1930 NUMBER 5

NIGHT BY A JUNGLE LAGOON

BY TOM GILL

ILLUSTRATED BY R. BRUCE HORSFALL

PEDRO'S wrinkled face smiled.

"After all, it is only at night when the jungle speaks. In two short months here in our Mexican forests, you think, perhaps, you have learned something of the way of the wild things. But it is not really so. For only at night, *señor,* the bitter fight for life begins. Then all the jungle becomes a battlefield, and the jungle things awaken and come forth."

My old Mexican guide leaned forward, and throwing branches of fragrant wild orange wood on the campfire, looked at me as if awaiting a reply.

Well, he was right. Two months knocking about through the mahogany forests of southern Mexico had certainly not rewarded me with much knowledge of the abundant wild life that I knew must exist there. Parrots by the thousands we had heard chattering and scolding in the high treetops at dawn and sunset, and sometimes throughout the day would come that deep, unforgettable wail of the howling monkey. Wild turkey, too, we had seen, as well as those fearless and dreaded demons of the jungle, the wild pigs. In fact, I had seen just a little too much of those wild pigs —ever since the day a drove of them had kept me perched uncomfortably in a cedar tree throughout one long sunny afternoon while their leaders sniffed up at me and dared me to come down.

But of that hidden mysterious life about us which at times would manifest itself in the sudden snapping of a branch, or by a muddied track beside some waterhole, or a feather floating down from the green forest canopy above —beyond these accidents we knew nothing. So I sat there, saying no word, waiting for old Pedro to speak again.

"THOSE FEARLESS AND DREADED DEMONS OF THE JUNGLE, THE WILD PIGS . . . HAD KEPT ME PERCHED IN A CEDAR TREE"

"She is very old and wise, this jungle," he smiled at me across the campfire. "And all her children are very wise, too. They have to be to live. Always their eyes are upon us—even now, perhaps, *señor*—and they follow us and signal about us, and they know our coming and going. Yes, even the Caribe Indians, in whose country we are, they know we are here. And I think, if they wished

"THE VAMPIRE BATS WERE OUT . . . AND KEPT ME EERIE COMPANY FOR THE NEXT HOUR"

it," he shrugged his shoulders in elaborate indifference, "we should not see tomorrow's dawn."

Now, down on the coast I had already heard of the Caribe Indian and of his playful way with blow-gun and poisoned arrow. Farther to the south, where they are unfriendly, white men had already lost their lives, but up here where I was now, these Caribes were thought a peaceful, furtive people, living their unknown mysterious lives apart from the other tribes who fraternized with the white man. Yet it was these same Caribes who, only a few years before, had played a game of deadly hide and seek with timber explorers and oil men prospecting there. At last, to give them warning of any Caribes who might be lying in ambush, the white men had taken dogs with them. One by one the Indians killed off the dogs, and, as a grizzled prospector once told me, "When you lost your last dog it was time to get out of the country, *pronto,* before something sudden happened."

And I remembered, too, the tale of a college professor who had come to study the language of these Caribes. He spent one night at the hacienda of my friend Dorenberg, then disappeared into the jungle. He never returned. Perhaps Caribes—perhaps not.

"Sometimes when we are caught out at night," Pedro's soft, lisping Spanish went on, "sometimes then we hear the jungle awaken and hear the moving of the jungle things about us. The bats, and the great moths and puma, the big cat, and other things that climb in trees and watch us from up there. But soon we light a campfire—as soon as we can—and everything moves back."

"Where would be the best place for one to spend a night and see and hear these things you talk of, Pedro?" I asked at length.

He thought for a while. "You remember that lagoon, *señor?* There where you measured the big mahogany trees yesterday? If one should sit there quietly all night without a fire and without smoking, he might hear and see much—if he felt no fear."

As to that, I made no promise.

But the outcome of it all was that the following sunset I took leave of Pedro and his comfortable campfire, and with only a long-focussing flashlight and a .45 automatic, I followed the dim game trail that led to the bank of the lagoon.

Even from the first, I think, Pedro had looked upon me as a little mad. More mad, even, than the average *Gringo,* who is at best a rather unpredictable fellow. But my decision to spend the night on the banks of a lagoon, far from a camp bed, mosquito net, or even the solace of tobacco—this must have seemed to Pedro a little too fantastic. For I remember he crossed himself piously as I walked away, and shaking his head, he rolled another of those interminable cigarettes, then sat down, gloomy and lonely in the glare of the campfire.

I walked quickly along the trail, hoping to reach the lagoon in time to get well settled and choose a comfortable hiding place before the descent of night.

It wasn't very wide, that lagoon. Broadly oval in shape, and about a hundred yards in its greatest extent, it lay there surrounded by deep jungle that grew down almost to the very banks, so thick that hardly a vagrant wind would have ever troubled those waters. It was quiet as a mirror now, and on its smooth surface dozens of brilliant dragonflies were darting, feeding on the smaller insects clustered about innumerable yellow waterlilies. A few ducks paddled at the farther end.

Directly opposite, and towering above the rest of the jungle, was a tall, dead zapote tree, its bare, decaying branches in sharp contrast with the green of the jungle.

The quiet of evening had fallen, and selecting a bare spot not far from the path, I sat down to begin my long vigil. But a sudden whirring in the air brought me to my feet again. High up against the reddening sky I made out a large flock of parrakeets. Even as I caught sight of them they had discovered the dead zapote, and with a sudden swerve and a steep glide they too had chosen their night's resting place. There must have been over a hundred of those lustrous, living bits of green, and now that bare, gaunt tree wore a prouder, more brilliant foliage than ever it had known in life. For a few moments the birds filled the air with their chattering, then, quickly as they had come, the noises died away, leaving a silent, twilight world before me.

But twilight in the jungle is only a matter of short moments, and even as I watched, the clouds in the west had turned violet, then mauve, then darkened into evening. A little stirring in the ground beneath me made me look down to where a hunting wasp was carefully burying a large grasshopper. I watched the little nervous, quickly-moving insect as she finished her task and hastened busily into the brush again. Somewhere down there, I knew, an egg had been laid and food provided for the grub that was some day to hatch and feed and grow and later take its own place among the great tribe of hunting wasps.

Already night had fallen. Behind me loomed the jungle, black and impenetrable, but ahead as my eyes grew accustomed to the gathering darkness, I could look out over the lagoon, and aided by the starlight, distinguish the low line of opposite shore. Greenish lights were flickering over there, lights that seemed to throb dully in the darkness and disappear. They may have been the phosphorescence of decaying vegetation. They were certainly not caused by any insect life, but they rose and fell in slow pulsations. Then suddenly I gave up speculating on their nature as a faint whirring in the air just behind me made me instinctively throw up my arm and turn.

The vampire bats were out. Back and forth before me, three of them kept me eerie company for the next hour, flying so close as they passed that I could dimly trace their evil, hairy faces, and distinctly feel the rush of wind beneath their wings. Curious fellows. More than once they hung motionless, so close that I could have struck them with my hat, peering at me, then off again, only to return, to stop, to look, to dash away again.

Far out in the lagoon I heard the muffled ripple of moving water. I could see nothing, but soon again it came—this time nearer. I flashed on the light and played it over the smooth water of the lagoon, where now, in the cool of evening, a light, fine mist was rising. Back and forth I swept that white cone of illumination, and at last held it steady out where two dull red eyes glowed like garnets in the darkness. Then I understood. The alligator, that old killer of the jungle, was abroad. Again I heard the water ripple as the monster—he must have been a big one from the width between his eyes—swam slowly toward me.

Held by the spell of the flashlight he came almost to

"FAR OUT IN THE LAGOON I HEARD THE MUFFLED RIPPLE OF MOVING WATER. . . . THE ALLIGATOR, THAT OLD KILLER OF THE JUNGLE, WAS ABROAD"

the bank of the lagoon, and there beneath my feet he waited, with upturned wicked, bloodshot eyes. Soon from the left, out of the darkness, came another cautious ripple, and farther on still another. And before half an hour had passed twelve pairs of ruby eyes were ranged down there before me, all looking hungrily, expectantly up into the flashlight. Above them, attracted by the illumination, great giant moths were fluttering on soft, brilliantly-colored wings just over the water's edge.

It is a moment I shall long remember. The blackness pierced by that long shaft of light, the red, wicked, little waiting eyes of the killers beneath me, and all about, in and out of the light, vanishing and reappearing, those great gaily-colored night moths. I thought of the Indian legend that tells how the souls of good children, in dying, are sometimes favored by the gods, and pass into these moth bodies, abiding there until they are born again.

While members of the American Nature Association's Caribbean Cruise in January will not encounter any such experience as did Mr. Gill (and, perhaps, will not wish to do so) they will find in this article the feel of the Tropics and the jungle. The author, who is Forester of the Charles Lathrop Pack Forestry Trust, has spent much time in tropical research. By special arrangement Mr. Gill will lead the American Nature Association party on the Caribbean cruise leaving New York on January 24 for Bermuda, Haiti, Panama, Cuba, Jamaica and the Bahamas. If the Cruise interests you drop a note to the Travel Editor, Nature Magazine, Washington, D. C. This trip will be an ideal winter vacation for lovers of the outdoors.

Tired at last of that solemn scrutiny of steady eyes, I chose a large stone and dropped it carefully on the nose of the biggest alligator. Followed an indignant snort, a mad lashing of the water beneath, and a sudden extinction of all those pairs of eyes. Once more I was surrounded by silence and jungle blackness.

It was a silence that continued until midnight, broken only by occasional sleepy complaints of some bird, as it awakened for a moment in a nearby tree. Once a swarm of mosquitoes found me out, but after five minutes of concentrated air raid, they left me, not to return.

Just at midnight, down to the right where a little stream fed the lagoon, rose a sound that always makes one's heart beat faster as it rolls through the jungle night —the deep challenging roar of a jaguar. The Mexicans will tell you he is a tiger, *tigre* they call him, and though he boasts no near kinship to that species, he is huge enough and courageous enough to command respect wherever one finds him. Three times the big cat growled in the thicket below me, and I heard the snapping of dead, dry twigs as he prowled around down there.

Now it is one thing to hear the midnight rumble of a jaguar when you are lying in the comparative security of a campfire's glow, but it was somewhat different perched up on the edge of an alligator-infested lagoon. From the crackling and trampling, it sounded unmistakably as if he were working my way. Abruptly the noise stopped. I waited, then tiptoed forward, and at last, with the cocked automatic in my right hand, flashed a stream of light down into that tangled mass of bamboo and palms.

The rest is a confused memory. I remember a snarl of surprise, a mottled, sinewy form that leaped by me, not ten feet away, and the flash of my automatic as twice I fired wildly after that fading shadow. I must have missed him by yards. The shots, doubly loud in the silence of midnight, shattered the peace of the surrounding jungle. Across the lagoon, parrakeets chattered and swore, while from afar off a band of monkeys shrieked and howled and made the night vocal with their opinion of all white men and their sleep-destroying devices. They seemed very abusive about it all.

It was hours before quiet returned to the jungle. In the meantime I amused myself with the never ending delight of watching the great luna moths flitting, ghostlike and lovely, in the long shaft of light that I played out over the water's edge. Several times I caught the eyes of an alligator, but they were wary now, and wouldn't come forward. Once, from the farther side of the lagoon, beyond where my flashlight reached, I heard a brief, agonized shriek, and the crash of a falling body, and I knew that somewhere another tragedy of the jungle had been played out.

But just as dawn was painting its first faint silver over jungle and lagoon, and I had almost given up hope of seeing more—just then my long vigil was rewarded by something I would have journeyed many miles to see.

Beyond the rising mists I first noticed a clump of palms shaking in a way that no movement of the wind could have accounted for. Straining forward and aided by the growing light of day, I saw two dark arms push the palms aside, and a moment later the almost naked figure of an Indian had moved silently down to the water's edge. In his (Continued on page 332)

THUNDERBOLTS OF SNOW

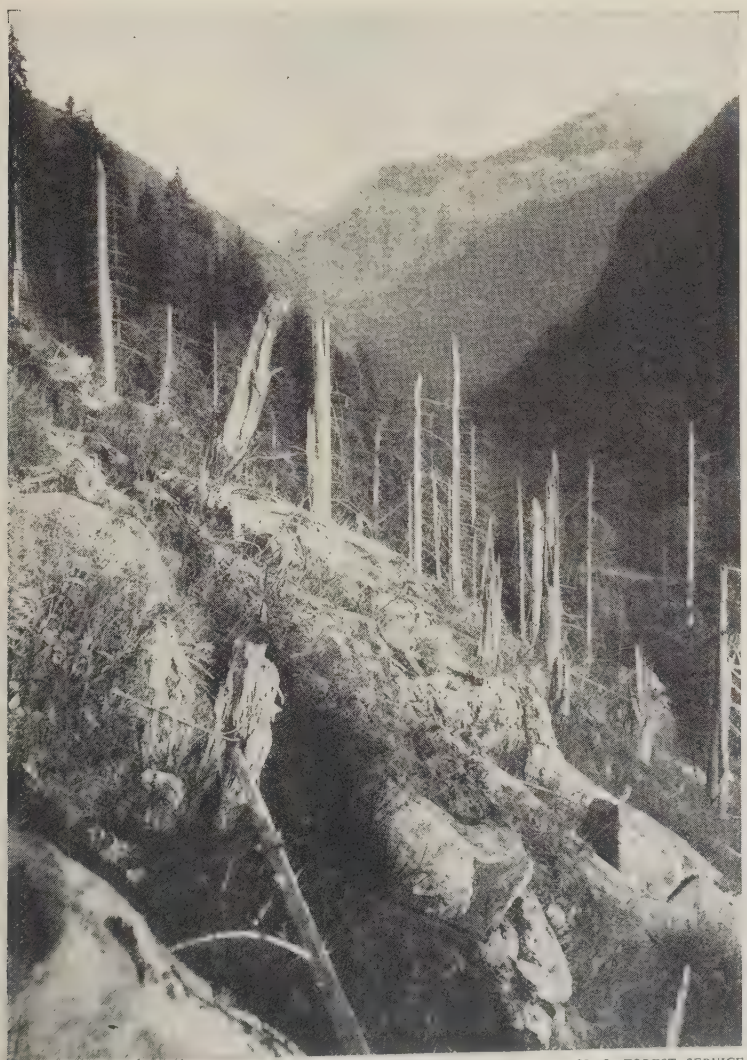
WHAT SCIENCE KNOWS AND IS DOING ABOUT AVALANCHES

BY CHARLES FITZHUGH TALMAN

IF YOU have never sojourned among snow-clad mountains, you probably think of the avalanche as a rather exceptional, outstanding event of Nature's program. From time to time the press despatches chronicle the fact that a party of travelers has been whirled into eternity, or perhaps that some Alpine village has been destroyed by what Lord Byron called "the thunderbolt of snow," and the newspaper-reader is likely to exclaim "Another avalanche!"—as one might say "Another tornado!" or "Another volcanic eruption!"

Now it is quite true that avalanche *disasters* are relatively rare. A well-known French authority, M. André Allix, estimates that in the entire world about a hundred human lives are lost in such catastrophes, on an average, every year. The property losses involved are almost trivial in comparison with those occasioned by fire, storm or flood; but the relative immunity of both life and property is not an indication of the scarcity of avalanches. It means merely that the vast majority of these phenomena occur in unsettled regions, and that in inhabited areas subject to them mankind has learned through experience where and under what circumstances they are likely to occur and takes precautions accordingly. For every one that is mentioned in the news on account of its calamitous effects, tens of thousands remain unreported because they are perfectly harmless.

An avalanche is a routine episode in the hydrology of mountains. A mountain, because it projects up into the colder regions of the atmosphere and especially because it forces the winds that blow against it to rise, cool by expansion and shed their moisture, is a great collector of snow, as compared with the surrounding plains. The average snowfall of the Alps, for example, is estimated to be about thirty-three feet a year, while on the western slope of Mont Blanc, at an altitude of ten thousand feet, the average is estimated at about sixty feet a year. There are places in the Sierra Nevada and the Cascade Range of the western United States with measured annual falls averaging more than thirty-five feet.



U. S. FOREST SERVICE

THE PATH OF AN AVALANCHE IN THE ALPS

The mass of ice and snow is but one cause of destruction. The fearful "avalanche wind" sometimes lays waste adjoining territory

As mountains do not continually grow in height on account of the snow deposited upon them, it is evident that this deposit must be removed by natural agencies of some sort, and there are, in fact, several different ways in which this is accomplished. A very large amount of the snow is removed by evaporation, which is an extremely active process at high altitudes. Another large part is melted, and the resulting water flows in torrents and cataracts to the valleys below. On some mountains much of the snow is gradually compacted to ice, which creeps downward in the form of glaciers. Again, a great deal of snow is blown from the peaks and upper slopes by the winds and eventually settles down at lower levels. Lastly, masses of snow lying on the mountainsides frequently become detached, for various reasons, and go sliding downward as avalanches.

Fully a dozen more or less elaborate methods of classifying avalanches have been proposed by specialists. The ordinary moun-

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AVALANCHE BARRIERS AND ARCHITECTURE

Elaborate terraces are precautions above tree line. The angular walls designed to split a descending snowslide protect this church of the lower slopes

A COLORADO SNOWSLIDE WRECKS A TRAIN

Such disasters are largely prevented today by snowsheds and long tunnels

U. S. FOREST SERVICE

taineer, however, recognizes only a few varieties, the most important of which are the dust avalanche and the ground avalanche. The former, which occurs in cold weather, consists of dry, powdery snow, great clouds of which fill the air as the mass sweeps down from aloft. The ground avalanche is commonest in spring. It is composed of wet snow, which slides over the ground, often carrying with it quantities of earth, rock and forest débris. It is also convenient to distinguish the top avalanche, which slides over a crust of older snow instead of over the ground, and the glacier avalanche, composed of fragments of ice or compact snow detached, mainly in warm weather, from glaciers or névé fields. As to the relative frequency of the different varieties, statistics recently collected in the French Alps are perhaps fairly representative of what may be found elsewhere. These show that of an average of 586 avalanches recorded per annum, 421 were ground avalanches, thirty-one dust avalanches, 132 top avalanches and two glacier avalanches.

Dust avalanches are the most dangerous of all, because they start on the slightest provocation and, as they are little retarded by friction, rush downward at a much greater average speed than do avalanches of the other kinds. A gust of wind may set the mass of loose snow in motion, or the impulse may be given by the mere fall of a branch, the tread of some animal's foot or even a loud sound. The vibration of passing trains starts many avalanches in the Rockies. Alpine guides insist upon absolute silence during the passage of places where even the sound of a human voice might release the terrible fury of the avalanche.

Dry snow, especially when it lies in hol-

FROM O. PROCHNOW, "Erdball und Weltall"

WHERE A SLIDE PLOWED THROUGH A WOOD

The typical fan-shaped mass of dirty snow and débris, in the right foreground, marks the termination of a "ground avalanche"

lows and in the lee of ridges, tends to become compacted or crusted so as to form large plate-like sections. Snow in this condition is known to ski-runners as "windslab," and it has been responsible for many fatalities in the Alps since the "playground of Europe" became as popular in winter as in summer. A slight disturbance, such as the cutting of a deep track by mountaineers in single file, may lead to the slipping of one of these sections, which breaks away with a report as loud as a rifle shot.

"Nothing," writes Mr. F. S. Smythe, of the Alpine Ski Club, "seems more innocent than a slope composed of windslab. The surface is often firm and compact, giving the ski-runner a feeling of perfect security, but disillusion follows with terrible suddenness. With a booming, rending roar the whole stratum of snow, sometimes several feet thick, splits away, breaking up into a

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WHERE THUNDERBOLTS OF SNOW HAVE LEFT THEIR SCARS

A mountainside forest in Montana that was conspicuously furrowed by avalanches. Few forested peaks escape such lines on their foreheads

PHOTOGRAPH BY BARONESS MARY KLENK
From J. Coaz, "Statistik und Verbau der Lawinen"

A "DUST AVALANCHE" IN ACTION AMONG THE ALPS
The shutter was snapped just as an enormous mass of powdery snow thundered down the Schiesshorn, near Arosa

vast swarm of hard angular blocks. The alpinist is at once carried off his feet and borne down in this besom of destruction. Even if he is not suffocated, he is likely to be crushed to death beneath the great blocks."

It is the swift downrush of dry snow rather than the more deliberate advance of the ground avalanche that produces in front of the descending mass the most remarkable examples of the "avalanche wind," the force of which, at its worst, surpasses that of any tropical hurricane and is rivaled only by the violence of the tornado. The air displaced by the avalanche rushes not only straight forward but also on either side, uprooting trees and causing general destruction hundreds of yards beyond the area reached by the avalanche itself.

A typical case of this kind was reported a few years ago from Alaska by Mr. M. B. Summers of the Weather Bureau, who writes as follows of a snowslide that descended the south slope of Mount Juneau into a ravine known as Gold Creek Gulch:

"Winding along the opposite or southern bank of this ravine at about fifty feet above the floor is a roadway with a heavy plank walk along its outer edge. Just below the plank walk, yet some distance above the bottom of the ravine, stood three cabins. These cabins happened to stand just opposite the one-hundred-and-fifty-foot broad section of the north bank, where the snowslide occurred. The force of the blast generated by the down-rushing snow was sufficient to demolish the cabins completely and their débris was carried a hundred feet up the slope in company with the four-by-four inch timbers and twelve-by-two inch cross planks of the walk.

"It appears that the wind had a lateral as well as a forward component, as was evidenced by the destruction of a cabin five hundred feet down the gulch in the direction of Juneau, the edge of the city being only a quarter of a mile away. The force of the wind was felt throughout the city and carried with it a blinding whirl of snow that came with startling suddenness and enveloped the city in a pall of semi-darkness for several minutes."

In the year 1819 the village of Randa, in the Alps, was almost annihilated by an avalanche wind. In this case the blast was not caused by a snow avalanche but by the fall of part of a glacier over a sheer precipice. The area on which the ice fell was uninhabited, but in the nearby village the wind scattered the houses like chaff, the steeple of a stone church was broken down, and it is said that heavy millstones were lifted from the ground and carried several yards up the mountainside.

Ground avalanches occur in great numbers in the spring, when the snow grows wet and heavy and the water accumulated under it tends to loosen its hold on the slopes. The majority of these avalanches descend by way of gullies, following the same courses from year to year. On many wooded mountainsides these reddish tracks of bare ground stand out conspicuously in summer against the dark green of the forest. In the Alps individual names are given to all the more familiar channels of this sort and to the avalanches that descend by them. In the inhabited districts of the Swiss Alps more than nine thousand habitual paths of avalanches are recognized. Unfortunately the sliding masses of snow do not always confine themselves to these channels but

sometimes take unexpected courses or extend much farther down the slopes than usual, and it is such cases that are often disastrous.

The history of avalanche disasters in the Alps runs back to the middle ages. In more recent times the avalanche of Saas, in Grisons, in 1689, wiped out the place and its inhabitants; that of Louèche, in Valais, in 1719, destroyed the town, killing sixty people; that of Obergestelen, in 1720, demolished one hundred and twenty houses and cost eighty lives. In Italy the avalanche of Deveis, in 1885, buried sixty-two people, of whom thirty-five perished; that of Frassino, the same year, cost seventy lives. During 1888 avalanches killed a total of one hundred and forty-five people in the Italian Alps. Since the development of great hydroelectric systems in the Alps these installations have been seriously damaged and hampered almost every year by avalanches, which block the watercourses and intake channels and destroy transmission lines, causing widespread inconvenience in the surrounding country through the suspension of service.

One of the worst avalanches in the history of our own country is remembered as the "Wellington snowslide." At the railroad station of Wellington, Washington, in the Cascade Range, on March 1, 1910, two trains, three large locomotives, the station building and a water tank were swept over a ledge into a canyon one hundred and fifty feet below, and about ninety people were killed. During the same winter seventeen avalanches involving destruction of life or property, or both, were reported in the mountains of Washington, Idaho and Montana.

Against avalanches, as against most other potentially disastrous visitations of Nature, mankind has devised a number of ingenious safeguards. The value of forests as a means of protection is generally recognized, and there has been much planting of trees on mountain slopes with a view to checking avalanches, at least in their early stages. The protective woods on Alpine slopes, known as *Bannwälder,* have been strictly preserved for centuries, and the cutting of trees in them was at one time punishable by death. Many of the places where avalanches originate are, however, far above timberline, or are too rocky to permit tree growth. In such places the Swiss construct walls of stone or wood, terraces, ditches or rows of posts to hamper the movement of the snow. In some districts it is customary to erect a bastion-like wall on the up-slope side of a building, with a salient angle designed to split the avalanche in two as it descends. Such a construction is called a "Spaltecke," or "Spaltegge." On mountain railroads in both the Old World and the New many costly tunnels and snowsheds furnish a partial protection from the unstable snowfields.

Avalanches are controlled by weather, and the experienced mountaineer can usually tell in a general way, from the prevailing atmospheric conditions in his locality, when they are most likely to occur. In Switzerland, where there is a somewhat intensive system of meteorological stations in the mountains, the daily weather map is an aid in making such prognostications, but the definite prediction of avalanches as a scientific undertaking is not yet on the horizon. Some day the problem may be solved.

MAKING LEAF PHOTOS

CREATING GOOD-LOOKING SILHOUETTES

BY ALICE A. NOYES

A SIMPLE method for photographing leaves requires no more extensive equipment than that used in developing ordinary photographic negatives, and creates interesting silhouettes. The leaf or flower subject is placed on some standard sensitized paper, such as Azo No. 4 or Velox, in a regular printing frame, and exposed from one and a half to two minutes at a distance of eight inches from the light. The paper is then developed in standard developing bath, and fixed in "hypo" for fifteen minutes. After washing in running water for one hour, it is then spread face down on cheesecloth until dry. The resulting print is similar to the print of a blade of grass shown in the accompanying illustration. It will be noted that the veins are not reproduced by this method but this leaves the opportunity for the child or adult to draw in the veins and thus learn something of the subject's anatomy.

SHE HAD ACTIONS FOR ALL MOODS
When happy, she would jump about, kick the sand and hide her treasures again and again

JUST MAGGIE

HER TRAGEDY HAD A HAPPY ENDING

BY MARJORIE SHANAFELT

ILLUSTRATIONS BY THE AUTHOR

Many of our readers have enjoyed and commented on Miss Shanafelt's entertaining stories of the Good Samaritan with wild friends. Miss Shanafelt is also a talented harpist and her readers will be delighted to know that after more than a year's lapse following an automobile accident she is now playing again. And writing, too.

MAGPIES have never been known to pass over our city until last fall when several flocks flew over. Calls came in again and again from interested people who wished to know what the striking black and white birds were. More than that, we soon found that some of those who inquired had been out with guns and had brought down these fine living targets. One flock was entirely annihilated. Of another flock there was but one left, and that one wounded. She was brought to Professor B——'s house by a small boy and the Professor brought her to the Museum in an old waste paper basket with a piece of cheesecloth tied down over the top.

When I unlocked the office door I found a great black and white bird solemnly stalking over the table, hopping upon chairs, and tapping at everything with her long thick bill. It hadn't taken long for her to tear a hole in the cheesecloth after the Professor had departed for an early class. The bird was friendly from the start. One wing trailed along at a grotesque angle but she had strong legs and hopped from one thing to another until she had tried nearly every perch the place afforded. I went out and bought her some steak, which she devoured ravenously, taking it directly from my hands.

Since there was nothing to be done about the wing if Nature did not heal it, it was necessary to give the bird a refuge for the time being, so upon a good-sized table we erected a fine roomy cage made of galvanized iron wire. There were perches inside and when it was all completed Maggie had a home about four and one-half by four by four feet. We put considerable sand inside and a big pan of water. It had to be a big one for Maggie required a great deal of fresh water. She would screech for fresh water and when it came would take about three swallows, letting it trickle slowly down her throat, after which she turned her back on the pan and kicked it full of sand. She wanted to hide everything she could get hold of, and since the cage offered few opportunities for burying her keepsakes, she worried over the problem a great deal. She punched things in the little cracks about the perches, and stuck them down between the wooden frame of the cage and the wire meshes. She dug holes by the hundred in the sand. Sometimes she would dig up an extra precious article again and again, hiding it in every corner of the cage. Visitors to the Museum were always giving her shiny things just to see what she would do with them. Every time the sand was changed we found a

WHERE THE MAGPIES NEST
Their homes are large and well-constructed, although in desolate locations

collection of pennies, nickels, dimes and even quarters that more than paid for the meat we bought for her.

Maggie's cage sat in the lobby, near a wire door leading into the workroom. When the sounds of hammering, drilling, and conversation began to come from the workroom she was happy. She would jump around her cage, kick the sand into clouds, dig up and re-bury her treasures, and finally subside on a perch from whence she sang with great gusto even if little real knowledge of harmony. She learned to imitate our phrases. If she was in a friendly mood she struck her perch sharply with her black bill, after which she would begin to gurgle and finally spill out a tirade of throaty sounds that dwindled away into charming little soft cooing notes. Although she always looked well groomed, only once was she caught taking a bath.

Maggie consumed one pound of boiling beef a week. She would accept pieces of meat as long as she could hold them, for instead of swallowing the bits, she stored them in her throat, and regurgitated them later, eating at her leisure. She preferred, however, to be given a piece big enough to enable her to stand upon it and whack and tear it with her bill. Sometimes she got a piece of liver for dinner but she didn't like it, for it got her feet all messy. She soon found a remedy for this. When the liver was presented to her, she threw it down upon the sand. Seizing it by one corner she would drag it around. With some difficulty she would next manage to turn it over and drag it around again. This covered both sides with sand after which she would take it onto a perch and devour it. She liked nuts but ate no fresh vegetable. Fruit she ate sparingly, although cherries charmed her because of the pits, which she rolled around and around in her mouth.

SHE HOPPED FROM LIMB TO LIMB
Maggie was perfectly friendly and seemed quite happy in captivity, among her rescuers

IN AN ATTITUDE OF PROTEST
Her friends could not always tell what was the matter, but it seems she wants fresh water

One day we put a live mouse in the cage. She spied it before the door was shut and with a sudden movement, too quick to analyze, descended upon the mouse, killing it with one stroke of her bill. She spent nearly an hour killing it over and over again before she ate it, skin, meat, and bones. For days she would look eagerly all around the cage hoping for another mouse, but never again did we catch a live mouse. It seemed as though all mice had taken warning and moved to some other building, following the fate of their brother.

Maggie came to us on a September day. She stayed all winter. Her wing was healed although it was a little out of line. February, March, April, and May passed. The windows were open and our hearts ached for Maggie. We decided to get her into the open and see if the wing could carry her north to her companions. There was a great deal of squawking on the part of Maggie at being carried out to the edge of town. We put her down on real ground again, amongst grass and field daisies. She was plainly delighted and stalked about majestically but sad to say, she could not fly. We waited a long time thinking that it might be just disuse that kept her from winging away, but the wing was hopelessly injured. Then we knew that we must take her back to the safety of her cage, for to leave her there meant an early death at the jaws of some dog or the sharp claws of some lean cat.

She kept warily just at the end of our fingers. We pursued her, faster and faster. She ran here, there. She grew tired, her bill opened and she gasped for breath. "Poor Maggie", we said but kept right after her. "Now

I have her", cried the Professor and put his hand down hard. "Yaa!", screamed Maggie and with a great effort bounded away, leaving all but one feather of her lustrous tail in the Professor's hand. But at last we got her, too tired to utter another scream, and carried her back to the smallness of her wire cage. The weeks passed, Maggie seemed perfectly contented, and was quite busy growing a new tail. In four weeks she had not only grown a beautiful one, but several new wing feathers.

One day a little boy came to see us. He wanted Maggie. He had a big chicken yard with a little house in it, and he had had a magpie before, so after thinking the matter over we told him that Maggie might pay him a visit and see how she liked the proposed quarters. We went out to see her once or twice and found her very happy. The little boy said she had managed to break out of jail several times but at length the danger of this was remedied and she was secure. There was a pine tree in the chicken yard and Maggie could hop from branch to branch of this. She would sit on a limb and sing and gurgle her thanks for the out-of-doors palace that was hers, entertaining the children who came and chattered to her, calling her "Pretty Maggie".

For days as we came into the lobby or passed through into the workroom we missed her gurgling notes, her soft happy little notes, and the sight of her glossy feathers, but knowing she is happy we have left her to live out her life in the shade of the pine tree and remember her as one of our orphans whose little tragedy found a most fortunate termination among friends who cherish her and who can give her a suitable home.

A WORD ABOUT CHUCKO

BY A. J. MILLER

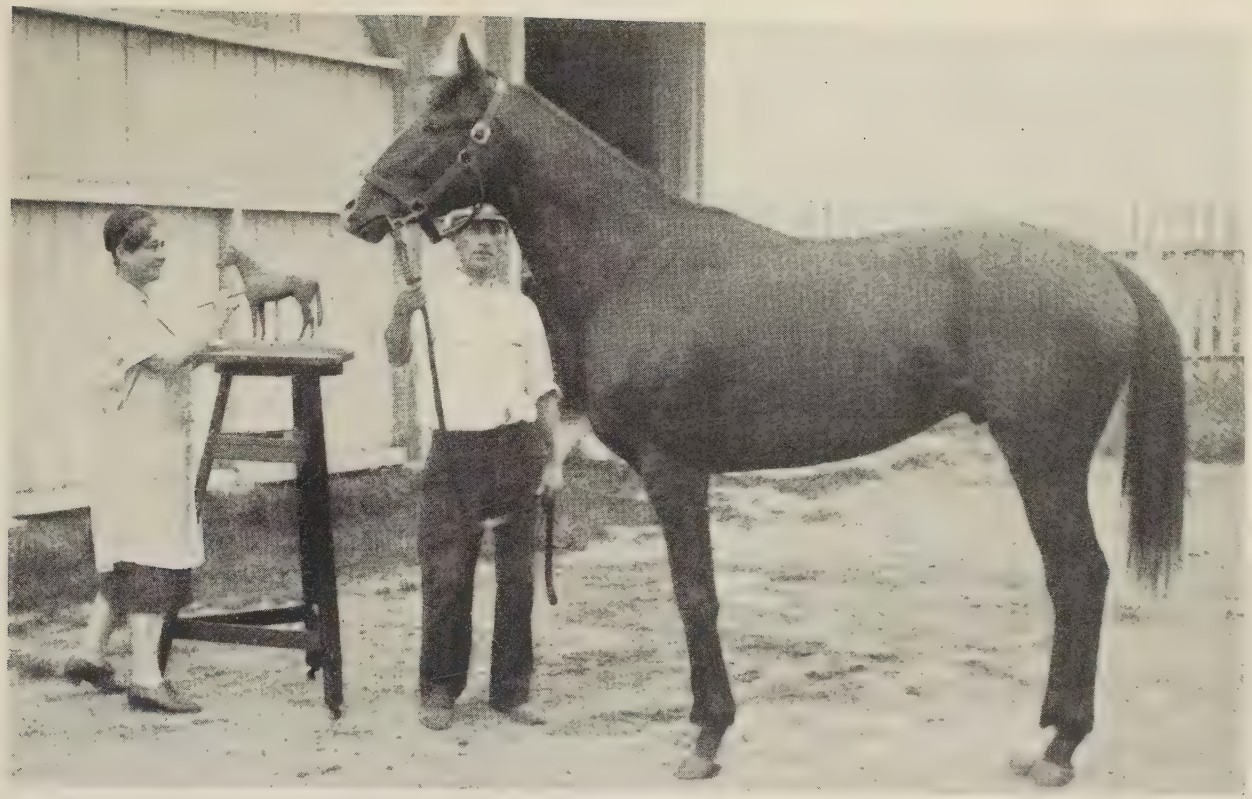
CHUCKO was caught when a little fellow—in fact, he did not have his eyes open, or perhaps he might not have been captured. He was brought to my home by the lad who took him, and we gave him his vitamines out of a spoon, which he hungrily lapped standing on his hind feet. Hardly could he tumble about before he was following the children like a house dog, and playing with them with all the enthusiasm of a tame kitten. When hungry, he used to nip at their ankles, wood-chuck fashion.

Chucko never learned to take reprimands in good grace—in fact, that was what caused him to leave. When scolded, he always did considerable chattering to register his displeasure. And since he quickly dug his way out of the barrel fixed up in the yard for his home to take up his abode in the house in the manner of a full-fledged pet, he came in for a goodly number of "scenes."

His final leavetaking was preceded by being accidentally caught in the screen door and pinched. Being much aggrieved at such unkind treatment he attacked the ankles of his mistress in quite too earnest a fashion, and she, in self-defense, cuffed his ears. To him this was simply adding insult to injury. It was time, he decided, to find playmates not quite so strong-armed. So without ceremony, he broke his home ties and ambled off by himself. And that was the end of our associations with Chucko.

GETTING HIS VITAMINES FROM A SPOON

With a background of rose-leaves, and the milk-bottle within reach, Chucko gobbles the noon-meal with vigor if not with gratitude



ONE OF THE GREATEST OF ALL TIME

WIDE WORLD PHOTO

W. T. Woodward's Gallant Fox, winner of more than $325,000, and the only horse, except Sir Barton, to win the Preakness, Derby and Belmont in one year, poses for Sculptress Elsa Knauth at the Aqueduct Race Track

WHAT ABOUT THIS HORSELESS AGE?

BY W. HOWARD FORSYTH

On a wet Saturday afternoon in late May, sixty thousand people stood in the rain at Churchill Downs to watch a white-faced chestnut colt race down the stretch to win the Kentucky Derby, $50,000 for W. T. Woodward of New York, his owner, and the title of the greatest three-year-old of his day, if not of all time. Two weeks before this famous horse had thrilled a crowd of forty thousand by his great victory in the Preakness, Maryland's classic race, and one week later another group equally large had cheered themselves hoarse in the rain as he galloped home four lengths ahead of a supposedly unbeatable horse in the Belmont Stakes. He had accomplished a feat performed only once before, by Sir Barton —he had won the Preakness, the Derby and the Belmont. And these were but three of his major victories.

Gallant Fox has netted more than $325,000 in two years of running. He stands as the greatest money-winner of race horse history, surpassing even Zev, whose winnings totaled $313,639. His only present-day rival, Blue Larkspur, has been forced to retire after collecting $272,070. But horsemen, his owner included, are less likely to consider his winnings than they are his great victories. With Man of War, he represents the finest in horseflesh, which through the ages has thrilled mankind. He is "front-page news"; he gets more attention from the people than automobiles, yacht races, and even aeronautical feats. Yet this is supposed to be the horseless age!

The modern horse, which the Fox and his great companions represent so well, is not a native of North America; but American history is horse history. If the white man has known this western continent 438 years, the white man's horse has known it 437 years. If the early adventurer, political prisoner and colonizer suffered hardships in a stormy crossing of the Atlantic on a small boat, his horse or his friend's horse, up on deck and cramped into a stock or crate too small to allow him to lie down, suffered no less.

It was the possession of horses, almost as much as the possession of metal armor, which accomplished the easy conquest of Indian tribes for gold-thirsty Spanish explorers. With horses, settlers along the eastern seaboard ventured into the Appalachian mountain country, then beyond it and by easy stages across the continent. Horses were few and valuable in those days; they did not do all the drudgery of hauling emigrant wagons, nor did everybody own a horse; yet the scouts, the messengers, the soldiers and men who protected these frontier settlements and westward-crawling caravans were mounted men.

A FIVE-GAITED GELDING
Harvest Moon, F. E. Robinson's prize winner, shows the full mane and flowing tail distinctive of five-gaited saddlers

century ago broke the hearts of the ponies of the famous Pony Express Mail lines. No horseman is sorry for the change. To-day, the saddle horse is a companion, a playfellow, a pal for the out-of-doors and recreation. As such, he is increasing in numbers; each year sees the organization of new riding clubs, new hunt or polo clubs, new horse shows and the building of more miles of bridle trails. The "dude" ranches of the Rocky Mountain states, which run into the hundreds and board thousands of vacationists yearly, owe their popularity and vogue not to the mountain scenery alone but to the opportunity they afford to enjoy that scenery with a horse. There are approximately one hundred thousand saddle horses in the cities and towns of the United States, and three hundred thousand more on ranches, plantations and farms.

Columbus, on his second voyage to the New World, his first voyage to a known destination, brought six horses to the West Indies in 1493. In 1527, Cabeza de Vaca landed in Florida with men and forty-two horses. These horses, the first on Continental North America, all died just as, hundreds of miles to the north and nearly a hundred years later, the first boat-load of English colonists were lost in Virginia.

Coronado on his conquest of Mexico carried a force of mounted men; De Soto, when in search of gold, marched west to discover the Mississippi River with horses and men. There is no record, but, inasmuch as after his burial the men floated down the river in frail boats, the

Through every step of American development our horses have stood by and aided man, and they still occupy the same relative position as they did four hundred years ago.

There have been many cries of a horseless age. When Fulton's steamboat floated away from the bank and then slowly moved upstream against the Hudson current; when the first steam locomotive raced and outdistanced a horse between Baltimore and Ellicott's Mills in 1830, and again some thirty years ago when the first automobile was demonstrated, certain horsemen became frightened lest the horse's day had ended. Others, mechanically minded and slightly visionary, prophesied the end of equine usefulness, but they forgot that for four thousand years horse and man, together, have explored and conquered the world. They will still be partners centuries hence.

THE SIRE OF GALLANT FOX
Sir Galahad III, owned by A. B. Hancock of Kentucky, is the worthy father of a great horse

The development of machinery has reduced the number of horses needed but there is little to suggest their extinction. Railways and trucks have taken the long hauls and heavy loads but the steady short hauls, regular year-round farm work and similar tasks are still performed by horse power. The airplane and railway has abolished the interminable runs at killing speed which half a

IRVINGTON BOUNCE III
This gallant Hackney mare has won 182 prizes, and is owned by J. Macy Willets of Massachusetts

horses must have been left in the interior. These horses and others, escaped from Coronado's men and similar expeditions, were probably the ancestors of the mustangs or wild horses of the Southwest. The herds multiplied rapidly but the elements and uncontrolled breeding dealt harshly with the aristocratic Spanish horse. He became smaller, less beautiful and speedy. Iron endurance was his greatest virtue and within the past decade some millions of the descendants of the mustang and his more northern brother, the broncho, have been rounded up and slaughtered. Their carcasses became fertilizer, or were sold for food in Europe; the ranges they were appropriating are of more value as pasturage for cattle and sheep.

The French and English colonists were not slower to bring their horses than had been the Spaniard. Horses were landed in Canada by the French in 1608, and by the English in Virginia in 1609. In this latter place they were of such importance that in 1657 a law was passed forbidding their export.

THE CHAMPION SADDLE HORSE
Likely Lady, who won the 1929 National Horse Show championship. Note the shaved neck and the trimmed tail

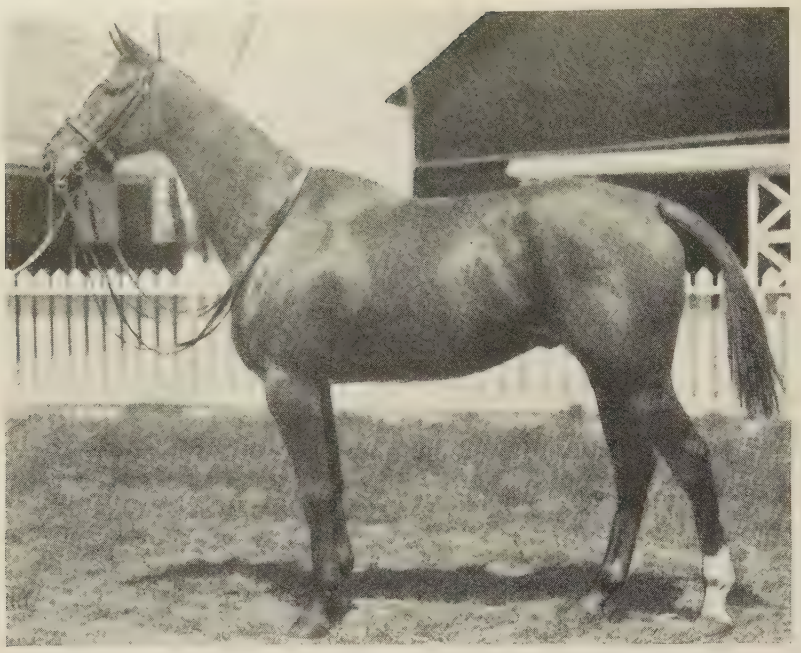
VETERAN STANDARDBRED
Guy Axworthy, 27 years old, and the greatest living sire of trotting horses

The Dutch brought horses to New York in 1625, thirteen years after their purchase of Manhattan Island. These were of a Flemish breed and became the progenitors of the Conestoga horse, a breed now extinct, that was developed in New York and Pennsylvania and that hauled the Conestoga wagons, forerunners of the prairie schooner, west from Philadelphia and Baltimore. They were the first American draft horses and, while inferior, were, very probably, much like the ones seen on the present-day milk wagon and bread wagon routes in our cities.

Just four years later, in 1629, horses were brought to Massachusetts Colony, but there is today no Society of Descendants of Mayflower Horses. The breeds which hold the center of the equine stage today were then unknown. In fact, that initial shipment of horse stock to Massachusetts occurred just three score years before the arrival in England of the Byerly Turk. This breed, followed in 1706 by the Darley Arabian and some twenty years later by the Godolphin Barb, makes a great triumvirate of oriental stallions which, crossed on native English racing stock, produced the Thoroughbred.

The Thoroughbred, the breed to which all running race horses today belong, must not be confused with the rather frequent incorrect use of the word "thoroughbred" to mean an animal of pure breeding. There is nothing, now, Thoroughbred except this one type of horse; there is no doubt, however, that they first received the name because they were pure in certain lines of breeding. The first to come to America is thought to have been Bulle Rock, imported to

PETER VOLO, A STANDARDBRED
His son, Protector, trotted a mile in 2:10, reported to be a world's record for two year olds



A THOROUGHBRED HUNTER, WITTEN FELL

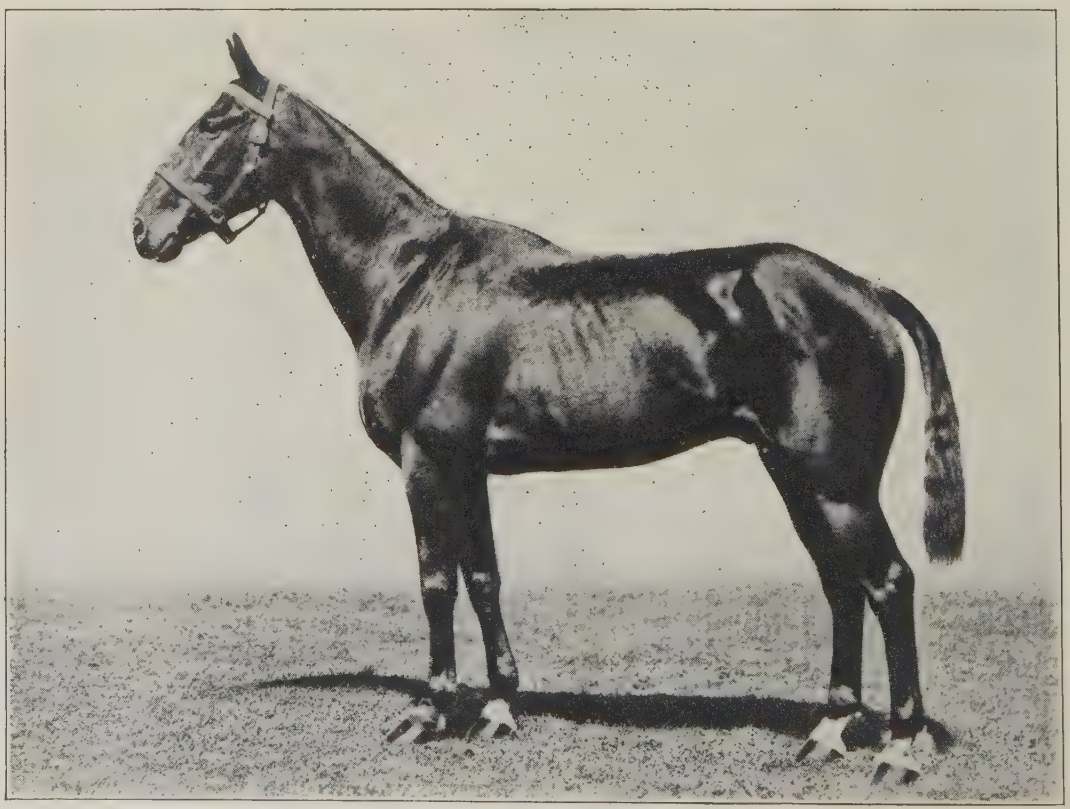
A. J. Davis of Long Island, New York is the proud possessor of this thoroughbred, whose long shoulder, high withers, heavy hindquarters and rugged bone exemplify his type

Virginia in 1730. Since that time American horsemen of wealth have bought the best that could be secured; to-day, the American Thoroughbred stands the equal of his brothers in any land. He is the swiftest equine that has lived, the gamest and most faithful of his race and his blood has been used to build almost every other breed of light horse. His fame will go down through the ages.

Eight Thoroughbreds have run a mile in less than one minute and thirty-six seconds, the fastest being that run at Belmont Park this year by Cherry Pie in 1:35-⅖. Turf racing, which has been carried on since before 1600, has grown to become a sport of unmeasureable proportions. In 1929, at tracks recognized by The Jockey Club, there were 1599 racing days, 11,133 races were run and over thirteen million dollars in stakes and purses were divided between the winners. Mr. Harry Payne Whitney, heaviest winner of the year, won $362,305 on his stable of forty-two horses, and in twenty-five years of racing he has received over three and a half millions in stake money.

Individual values run high in the Thoroughbred breed. The late August Belmont received $265,000 for Tracery when that good horse went to the Argentine. In Europe six sires have brought $200,000 or more, and one in South America was sold above this amount. In 1928, Mr. C. V. B. Cushman of Connecticut set a new record when he paid $75,000 for New Broom, a yearling, and the next year the sale at auction of 855 yearlings of the breed averaged $2,538.68 each.

Thoroughbreds are usually (Continued on page 324)



GAY BOY, STAR POLO PONY OF THE INTERNATIONAL MATCHES

He made his fame in 1924 and in 1927. His sire was a thoroughbred and his mother a Texas cow pony of unknown ancestry

WALTER E. HASTINGS

CENTRAL AMERICA'S MOST PICTURESQUE BIRD

Like an overladen airplane in flight, with a beak the wonder of artists and the subject of controversy among scientists, the toucan is a delightful feature of tropic lands

THAT BIRD THE TOUCAN

BY ALFRED O. GROSS

SHOULD anyone ask the question,—"What is the most peculiar bird in the American tropics?", my answer would be—the toucan. This bird is the most peculiar, the most grotesque and the most abundant of the large birds to be found in the deep primitive jungles of the torrid zone. Its unique feature, which invariably commands attention, is the enormous, highly-colored beak, altogether out of proportion to the rest of the bird. The impression made on the natives by the great bill is reflected in the common local names of *Pico feo,* ugly beak, and *Cara fea,* ugly face, as well as in the name *Curre de pico grande,* which is applied to the larger toucans in many parts of Central America.

There are sixty species of toucans restricted to the continental portion of tropical America but only about ten of them occur from Panama northward. The family is most numerously represented in the valley of the Amazon. Of the species represented in Panama and Central America the short-keeled toucan, *Ramphastos brevicarinatus,* is by far the most common. It is distributed from Honduras in the north to Colombia, the southern limit of its range. The sides of the head, the throat and upper breast of this species are bright lemon yellow, the lower margin of the yellow breast is outlined with a narrow band of deep red. The general color of the remainder of the plumage is a glossy black, except for the pure white upper tail coverts and a corresponding patch of deep red on the underparts. The great banana-shaped bill is gorgeously colored with greenish yellow, orange chrome and shades of blue and green. Both the maxilla and mandible are tipped with rich maroon, giving them a most vivid and unnatural appearance. Parts of the bill are prized by the natives as ornaments and in the time of muzzle loading guns were said to have served as powder flasks. The sexes are similar in coloration, but the female is noticeably smaller than the male, and her bill especially is not as large.

Just why the toucan should have such an enormous beak is a question which has been a source of speculation and wonder ever since the bird was first discovered. One of the first theories advanced was that the vast spaces of the bill housed the structures involved in a highly developed olfactory sense; another advocated that the bill provided great powers of mastication, and still another fantastic idea advanced was that the great serrated bill was used in sawing off deep corollas of flowers in order that the bird might secure the insects attracted by the nectar of the blossoms. In the effort to determine the purpose of the bill these and a great many other theories have been offered but none of them can stand

JUST ABOUT TO HOP OFF FOR ANOTHER TREE — WALTER E. HASTINGS

The adult toucan perches on a dead limb, revealing to the photographer the details of his marvellous bill

Related to Mr. Hexom's cover in color on this issue of Nature Magazine is Dr. Gross' interesting story of the toucans of the Tropics. The author's acquaintance with the bird is a personal one acquired during his stay at the tropical wild life station on Barro Colorado Island in Gatun Lake, Panama Canal Zone.

This fascinating island is the important center of tropical wild life research and is both a sanctuary and experiment station. A visit to Barro Colorado Island by the members of the

the test of investigation. Those who have given a thorough study of the whole problem are of the opinion that the bill has no adaptive significance. In any event, however, the bird can use it in an amazingly dextrous fashion, whether it be to preen the feathers of its back, to crunch the large fruits of palms or bananas, or to reach for small berries growing on slender branches well away from its perch. Not only does this great beak serve well in the serious business of living but it also has its part in play. Not infrequently these birds may be seen "billing" each other or using their beaks to fence in a veritable athletic contest. The conflicts, however, are all in good humor and the birds never strike for blood. They seem to enjoy thoroughly the company of each other, playing like a group of active school boys as they chase each other among the trees, snapping their beaks and uttering their characteristic piercing calls. The bill is an effective means of defense but the toucan is not aggressive and I have never seen him in actual combat under normal conditions. Slightly wounded birds, however, are very ferocious and are able to deliver very violent strokes. A grasp of their bill is to be rigidly avoided under such circumstances.

ONLY THIRTY-ONE DAYS OLD — DR. JOSSELYN VAN TYNE

He's quite naked, although wing feathers are growing

During flight the enormous bill extends forward and slightly downward, giving the creature the appearance of an aeroplane with an elongated, overweighted bow. The direct flight consists of rapid strokes of the short rounded wings alternating with graceful glides. They are weak fliers, not capable of long journeys and therefore never make extensive migrations. On several occasions in watching these birds cross wide timbered valleys in Costa Rica I noticed that they travelled only short distances, taking every opportunity to alight at frequent intervals in the tops of the tallest trees as they progressed across the relatively small spaces. Sometimes in attempting long jaunts across treeless areas they may fail to reach their objective and fall lower and lower until they strike the open ground or water and are thus destroyed.

The toucans are birds of the dense primitive forests and there only are they at home. They do not always keep themselves hidden in the dense vegetation but may frequent the tops of the tallest trees. It is not uncommon to see them forming the pinnacle of an upright dead limb that projects high above the surrounding tree tops. At Barro Colorado Island, Canal Zone, there were several such vantage points in view from the laboratory where almost every morning and evening the birds came to sun themselves or to preen their feathers. In the dense jungle the presence of these birds is usually made known by their shrill monotonous frog-like "Kree, kree, kree" calls. The uttering of these notes is a serious matter with the toucan. At the beginning of his song he throws up his head and tail and with each succeeding "kree" the two

American Nature Association's Caribbean party,—described in the October issue,—will be one of the high lights of that cruise in tropical waters.

Just before going to press with this issue we received word from Mr. Arthur Newton Pack, President of the American Nature Association, that he and Mrs. Pack plan to go with our Caribbean party. Readers interested in this fine winter trip may obtain all information by writing to the Director of Field Trips, American Nature Association, Washington, D. C.

MUCH BETTER TO BITE YOU WITH, MY DEAR — WALTER E. HASTINGS

The serrations of the mandible are clearly visible. Despite the ferocious beak, however, the toucan is a peaceful fellow

appendages are slightly dropped. The bird appears to be some unwinding mechanical device. Then suddenly up go the head and tail, after a few calls, and the whole unwinding process is repeated. The succession of notes is fairly rapid, at the rate of about one hundred to the minute. The birds usually cease calling at sunset and then depart to their roosting places in holes of trees located in the remote parts of the jungle. A captive bird when roosting retroverts its tail so that it lies against the feathers of the back. At such times the bill is turned over the shoulder and nestled into the plumage until it is completely hidden from view. This curious roosting posture, which certainly demands a minimum of space, is probably correlated with a communal roosting habit and their custom of nesting in cramped quarters of tree cavities.

HE'S JUST LEFT THE NEST

The bill gives an indication of its future greatness

Until recently little has been known concerning the nesting habits of toucans despite the fact that they are among the most abundant of the tropical species of larger birds. They are shy and suspicious during the mating season and avoid the vicinity of the home when human intruders come near. The nests are in natural tree cavities usually at a great height from the ground, and thus are inaccessible and difficult to find. On Barro Colorado Island, where the presence of an excellent biological laboratory makes life history work more easily accomplished, Dr. Josselyn VanTyne found five nests during the course of two seasons and in a systematic and detailed study of the birds has made a most valuable contribution to the knowledge of them. The abodes he found were all in tree cavities ranging from nine feet to one more than ninety feet from the ground. The very conspicuously colored nesting bird is completely concealed when incubating the eggs and brooding the young, a fact which readily explains why so few nests have been found by naturalists and collectors in the past days of study.

The eggs vary from one to four to the set. They are dull white in color and are curiously sculptured with irregular pitted grooves that are most prominent at the larger end. The eggs are somewhat rounded in shape, and about one and one-eighth by one and one-half inches in size. They weigh from seventeen to eighteen grams each. Both birds take part in incubation but the exchange at the nest is not accompanied by an elaborate ceremony such as is characteristic of many similar species of birds.

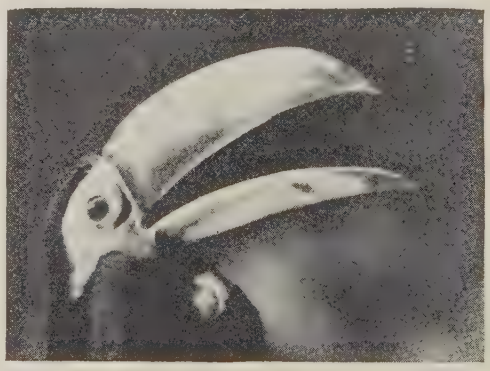
The young when hatched are naked without even a vestige of down. Their skin is pink at first but soon becomes a golden brown, a color that is retained until the feathers cover the body nearly a month later. The bill of the very young is broad and heavy but is not at all suggestive of the enormous proportions of the beak of the adult. At this stage the nestlings are extremely weak; their heavy head usually rests on the floor of the nest and

the body is supported by the abdomen and the well formed heel pads. These heel pads are even more highly developed in the toucan than the similar structures found in the hornbill. They are very important features of the nestling, but are cast off after the birds leave the nest and there is no trace of them by the time the first plumage has completed its growth. After the first plumage is attained the toucan, unlike most other birds, moults but once during the course of the year. The new plumage is acquired at the close of the nesting season.

According to Dr. Van-Tyne the nest cavity of the bird is used year after year by the same pair of toucans and they may take possession of the hole a month or six weeks before the time of egg laying. The number of homes is limited, hence this practice insures the pair of a place when the proper time arrives. The birds do not excavate the cavity but remove the rotten wood and debris which collects there during the rainy season. The birds have a habit of taking green leaves into the nest. When these are dried they are taken out again. No plausible explanation has ever been given for this manoeuvre. The only other material added to the nest are fruit seeds and pits disgorged by the birds. The young are fed very largely on fruits and berries, by both the male and female, each of whom takes part in the collecting duties. On one occasion a small snake and at subsequent times a lizard and a giant forest grass hopper were brought to the nest, but animal life constitutes a very small part of the food of either the young or the adults. At the Monte Verde banana plantation in Costa Rica the toucans were very numerous in the surrounding jungles and there the birds were quick to avail themselves of the discarded bananas left to ripen in the field. The examination of stomach contents as well as field observations indicate the food of the short-keeled toucan to be primarily vegetable matter. Captive birds, however, are omnivorous feeders and greedily eat bits of meat offered to them. Several birds kept in confinement thrived on a diet of milk and bread. Small snakes, mice and other small mammals were readily torn apart and masticated by their serrated mandibles. If the object of food is small they seize it, throw back their head and swallow it at a gulp. A most curious bit of their feeding behavior is the regurgitation of food for further mastication.

WHERE TOUCANS DWELL

The entrance, larger than appears here, was about seven meters up in a Gorgojo tree



THAT HAPPY SMILE

But perhaps he only wants food. This Cyrano of bird life is diminishing in numbers

Unfortunately toucans are considered a great delicacy by the natives and large numbers of them are killed for food. In a lowland village of Costa Rica I met a native with four of these gorgeous creatures suspended from his belt. On questioning him he revealed to me that he killed an average of ten or a dozen every week and prized them more highly than any other kind of meat. If such killing becomes general it is destined to have a telling effect on the numbers of this splendid bird, the most striking of all the jungle species. At present, however, it appears to be holding its own. Throughout its range it is abundantly represented not only in all the heavily timbered areas of the lowlands on both the Atlantic and Pacific coasts but also up the mountain slopes to an elevation of three to four thousand feet where it is less apt to be molested.

Plans are now being worked out for the 1931 western field trips. A report on the 1930 trips will be found in this issue and all readers interested in receiving an early announcement of next year's plans are urged to write in and have their names placed on the list to receive the new booklet "On Western Trails", when it is issued.

THE THIRD GLACIER PARK PARTY, BOOTED AND SPURRED

Left to right: Dr. G. C. Ruhle, Irene S. Nichols, Adele Potts, Warren Wilson, Edith Van Syckle, Rebecca Holmes, Mabel Egbert, Laura Juker, Antoinette Wilson, Art Staton, and Paul F. Hannah

WESTERN TRAILS

BY RICHARD W. WESTWOOD

THIS is by way of a report of stewardship. This summer, despite business conditions that seriously restricted summer travel by rail, the American Nature Association carried on. Our parties rode the trails of Jasper and Glacier, visited the amazing Yellowstone, saw the glorious formations of the Southwest and reveled in the untouched glory of the British Columbia coast. They came back refreshed by a trip with kindred souls in a family party, and stimulated by a far more intimate knowledge of what they had seen than is the privilege of most tourists.

Jasper Park, included in our trips for the first time this year, proved to exceed all expectations. Differing radically from Glacier in the character of the country through

THE YELLOWSTONE PARTY AT CAMP ROOSEVELT

Standing, left to right, Caryl Parker Haskins, Mabel Egbert, Marjery Hall, Martha D. Bowen, "Doc" Way, Dorothy Robertson, Mrs. M. L. Arnold, Mrs. Haskins, Dorr C. Yeager. Kneeling, Nettie M. Sadler, Artie I. Bailey, Venita P. Edwards, Russell T. Edwards

AN indication of what Jasper and British Columbia hold for the bird lover and what one of our parties saw, may be gained from the following list of birds seen and identified by the first Jasper Park party. The list was compiled by Miss Katherine Crisp, better known as Petey. The birds: golden-eye duck, harlequin duck, old squaw duck, red-breasted merganser, chipping sparrow, golden-crowned sparrow, white-crowned sparrow, timberline sparrow, pine siskin, Townsend solitaire, junco, black-capped chickadee, mountain chickadee, gray-cheeked thrush, olive backed thrush, hermit thrush, Maryland yellow throat, Audubon warbler, myrtle warbler, western tanager, golden eagle, bald eagle, blue grouse, Richardson's owl, ruffed grouse, mountain bluebird, spotted sand-piper, whisky-jack, Wilson warbler, rosy finch, kingfisher, hummingbird, great blue heron, Canada goose, cedar waxwing, tree swallow, barn swallow, arctic horned lark, winter wren, herring gull, short-billed gull, Bonaparte gull, common tern, pigeon guillemot, marbled murrelet. The list of mammals seen totaled fourteen.

which run its trails, it rivalled Glacier scenically. Maligne Lake will linger forever in the memory of the members of the two Jasper parties who stayed on its shores, enjoying the real hospitality of Fred Brewster's chalet, not to mention some of the best lemon pie ever fabricated in North America. The snow-drifts and tundra of Little and Big Shovel Passes provided an experience that was really different.

Three parties visited Glacier, two going into the northern part of the Park and one following the route of the three 1929 parties. All returned with that affection for Glacier and that desire to return which is born in us all by that wonderland of mountain peaks. Art Staton guided the parties over the trails and "Doc" Ruhle interpreted everything in Nature, aided and ably abetted by "Doc" Teall and the other members of the Naturalist Service.

Jasper and Glacier, linked as they were by the boat trips from Seattle to Prince Rupert, joined to provide what one member described as the "greatest trip in North America". The good yachts *Westward* and *Caroline,* with skippers Dykeman and Higgins, with galleys presided over by the deft Jack and Archie, made their way among the fascinating islands of the coast and inland among massive glistening peaks. The trip up the swift Kitlup River with camp at night on Kitlup Lake—or way stations—provided a thrill and an experience rarely encountered. Such a trip could not be duplicated unless one could afford to hire a private yacht, and even then it would be hard to gather together a group of such royal good sports as the American Nature Association parties apparently always attract.

In the Yellowstone, travelling on a special schedule permitting more leisure and avoiding large crowds, our party found all that it sought. Camp Roosevelt particularly drew the plaudits of the group since it is not so heavily visited. The trip to Goose Lake proved to be an interesting one and the country was beautiful. In July Grasshopper Glacier is quite thoroughly covered with snow but the members of the party felt the trip worth while nevertheless.

The Southwestern trip, combining the Indian country, Grand Canyon, Bryce and Zion, was as complete a visit to this country as was possible (Continued on page 331)

THE FIRST JASPER PARTY AT MALIGNE LAKE

Standing, left to right, Walter S. Little, Hamilton M. Laing, Fred Brewster, Warren Wilson. Seated, Kate D. Huber, Dorothy Jameson, Katherine Crisp, Antoinette Wilson, Edna E. Westwood, Flora T. Little.

BUFFLE-HEAD

During the breeding season these are birds of the interior of Canada, but they spend the winter across the United States as far north as there is open water, and are also found on the coastal waters feeding upon mollusks, shrimps and other water life. They fly close to the water in a direct, swift course, and travel in small irregular flocks. Being expert divers, they disappear suddenly, and swim under water swiftly enough to catch the small fish which make up a large part of their diet either in inland streams or on the coast. Most commonly they nest throughout the wooded part of their range in old flicker holes or other cavities, but have been known to use old gopher holes in banks where trees were lacking. In any case the nest is usually not far from water and is lined with broken woody material and feathers. The yellowish-buff, slightly glossy eggs number from six to fourteen, and are incubated and cared for chiefly by the female though the male may help look after the young birds, while they learn to be divers worthy of their sires.

BUFFLE-HEAD—*Charitonetta albeola*

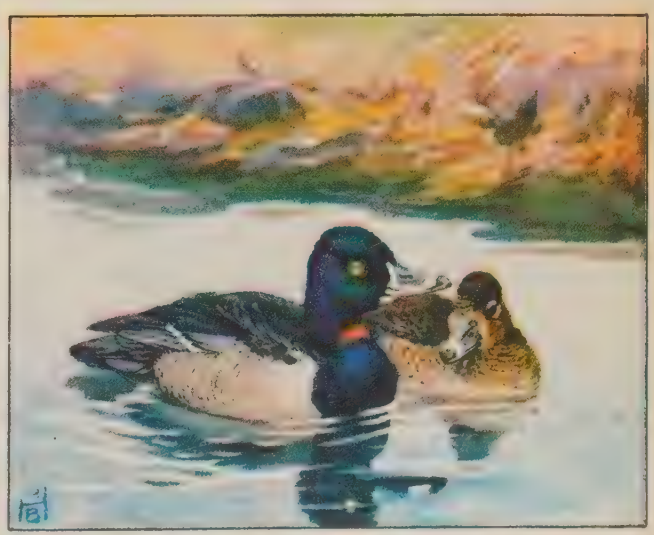
EIDER—*Somateria dresseri*

EIDER

These beautiful birds whose down, because of its lightness, elasticity and nonconductivity of heat, is used for sleeping bags, have been greatly reduced in numbers. Since under proper protection they become quite tame, and one set of eggs and down from the nests may be taken without danger to the flocks, the monetary advantages to the peoples living where nests are common is obvious. From the Maine coast northward through eastern Canada and Labrador, they place their nests upon the ground not far from salt water, usually in colonies on small islands. The nest, made of matted seaweeds and grasses, is concealed beneath low growths or open to the sky in hollows between rocks. The four to six pale olive, rough and lusterless eggs are mottled with dull white. Only the female cares for the brood which follows her to the water soon after hatching, to become experts at diving and swimming. Their food is chiefly mussels found on rock ledges during the day. When evening comes they fly to deep water for the night.

RING-NECKED DUCK

These are ducks of the interior fresh water marshnds and breed throughout central North America, intering in the United States and south into Mexico. hey fly swiftly in small open flocks; if one is close ough to see the ring on the neck and on the bill, these e diagnostic features. They dive well and swim under ater by means of their large strong feet. They feed on eds, snails and insects; in streams they eat crayfish, well. The nest is built on a tussock, preferably in me well concealed rather wet place, and is made of ied grass lined with dark gray down from the mother's east. The eight to twelve dark buff eggs are smooth d slightly glossy. The male leaves the entire charge the family to his efficient mate. In winter flocks metimes spend the nights far out on the waters of the ean or of the Gulf of Mexico, coming in to the fresh ater ponds in the early morning to feed on seeds, ves and roots of water plants, small forms of imal life and to fatten in the rice fields of the south.



RING-NECKED DUCK—*Nyroca collaris*

HOODED MERGANSER

Hooded mergansers are widely distributed ducks and choose wooded areas along streams or near marshland as homes. Here they find suitable nesting sites in rotted logs and stumps of dead trees. There is no rule as to the height from the ground this hole must be, provided it is large enough to accommodate the family. They have even been known to build upon the ground in a semi-cavelike spot and they have also used boxes put for them in the type of surroundings they would normally choose if natural cavities were present. The eggs are glossy white and usually eight to twelve, though sometimes more are found. Since these hatch in nests sometimes far from the ground the problem of how the young get to their native element has been much discussed. It is known that the mother has coaxed them to the nest opening whence they have dropped to the ground or water unharmed. These mergansers are also called timberland ducks and are birds of our fresh water streams where they feed on fish and plants.

HOODED MERGANSER—*Lophodytes cucullatus*

MERGANSER—*Mergus merganser americanus*

MERGANSER

These mergansers breed throughout the northern hemisphere and spend the winter southward from the southern edge of ice in open waters where food is obtainable. Often a number of birds drive a school of fish toward the shallows where they dive and swim swiftly under water to capture their prey. Merganser bills are supplied with backward turning serrations which help to hold the fish. These birds spend the night upon the open water far from land. Though they are heavy birds, their flight is swift and straight. When nesting time comes the male leaves all family cares to his mate. The nest is usually placed in some hollow in a tree, which is lined with grass, moss and leaves. There is a thick inner layer of feathers and down from the breast of the mother. When she leaves the nest the six to sixteen creamy-buff eggs are snugly tucked under a similar soft coverlid, the warmth of which is, for a time, at least, fully as effective as the mother merganser sitting on the nest. The young leave the nest in a day or so after hatching.

RED-BREASTED MERGANSER

These are coast birds during the winter months, feeding in the estuaries and as many miles up stream as open water is to be found. The chief article of food is fish, though mollusks and crustaceans are also taken. They often drive the fish, confuse and capture them by diving. When nesting time comes they seek fresh water ponds not too far inland where, in some well hidden marshy depression, a nest of coarse grass is made. Eight to sixteen smooth olive eggs are nestled in a thick blanket of down and incubated for about four weeks. The young are ready, in a few hours, to follow their mother in search of food. The male bird aids in their care and the whole family keeps together. If danger threatens, the young squat and are absolutely still while the old birds distract the attention of the intruder. They breed in the northern part of the Northern Hemisphere and winter from southern Canada to the Gulf of Mexico. They are essentially marine ducks, truly graceful when diving, flying or swimming through the foamy breakers.

RED-BREASTED MERGANSER—*Mergus serrator*

OLD-SQUAW—*Clangula hyemalis*

OLD-SQUAW

These noisy, long-tailed ducks are summer birds of the arctic tundras, but spend the winter months along our seacoasts, and on some of the larger lakes. Their widely scattered nests, on islands and along the shores of fresh water ponds, are built up a few inches with weed stalks and lined with down from the breast of the bird as the one set of five to seventeen smooth, greenish-buffy eggs are laid. Enemies are many and the female carefully covers these eggs when she must leave the nest. As soon as the young are able to undertake the journey, the mother leads them to open water where they are taught to dive and feed upon succulent plants, seeds, and insect larvae. When fully grown they join their elders in the journey south, where mollusks, shrimps, sand fleas and marine insects are found on the beaches and in the shallow waters of the tide flats. The flight of these birds is swift though erratic. At night they join other ducks which seek safety by congregating in immense rafts upon the open water, far from shore.

SURF SCOTER

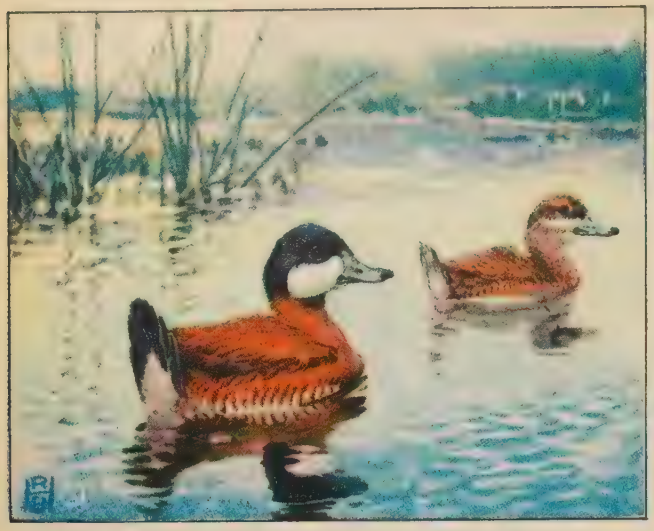
These scoters, the most widely distributed of their kind, breed in the marshy interior of northern North America and winter south along the Atlantic and Pacific coasts. Their flight, once they are in the air, is swift, strong and continued, and the flocks, though large, are without regular formation. In common with other sea ducks, they are adepts at surf diving and use their ability while feeding on small mollusks in the shoals off the coast. Their nests are usually placed in the shelter of low-growing evergreens or grass clumps, generally on the shores of inland ponds. These are never built close to each other, so are not easily found. A depression in the ground is lined with grass and leaves with a margin of down and the five to nine eggs are pale pinkish in color. The female cares for the family and they feed on crayfish, shellfish and bulbs of water plants, until they are ready for the long autumn flight to the far off winter feeding grounds. In migration they fly in greater numbers during the early morning hours.

SURF SCOTER—*Melanitta perspicillata*

WHITE-WINGED SCOTER—*Melanitta deglandi*

WHITE-WINGED SCOTER

On islands in the lakes and ponds of northern North America from Labrador to the Aleutian Islands, these scoters place their nests on the ground in hollows under brier tangles. The usual lining of down is supplemented with bits of sticks and dried leaves which render the nests well nigh invisible. The nine to fourteen pinkish-buff eggs are usually smooth. While living in the interior they feed on mussels, snails, frogs, crayfish and the plants of marshlands. During the winter months they dive for small mollusks and mussels along the submerged rocks on both coasts. These are the largest of our scoters and easily recognized when swimming, because they float high upon the water. Their flight habits are varied from long straight lines close to water to high flight in irregular formation during migration. Their "morning flight" begins at sunrise when birds circle in pairs over the prairie edge of some large inland lake, much like a flock of swallows, for half an hour or so before they depart to settle at the lake center.



RUDDY DUCK—*Erismatura jamaicensis rubida*

RUDDY DUCK

These are among our smallest ducks and differ from others of North America in having a complete seasonal change of plumage, an egg exceedingly large, and an extensive distribution. The male is conscious of his beauty as he struts about with tail saucily erect and his bright blue bill pointing the way. Marshes and sloughs of western and central North America afford choice material for their basketry nests fastened to growing reeds near the water. There are six to ten rough, thick-shelled, white eggs. The male remains near during the month of incubation and shares in the care of the young after they leave the nest. Since these are diving ducks, much of their food consists of the bulbous roots of water plants taken from the bottoms of pools, augmented by small forms of animal life. During migration they travel in flocks low over the water. Their winter feeding grounds are the shallow brackish estuaries along the coast, where they live on small crabs, grass seeds and many sorts of snails.

GOLDEN-EYE

Small flocks of active migrating golden-eyes circle and climb high into the air, then are off with strong swift flight toward their breeding grounds in the north. They are expert divers and feed on deepwater shellfish, though their usual diet consists of small fish, mollusks, insect larvae and plants obtained by dabbling in shallow water. The nest, in a tree cavity, is discoverable from bits of down clinging to the entrance. Here the five to twelve thin-shelled green eggs are placed on a bed of soft rotted wood and down. The site is usually along the shore of a pond or lake so that the single brood, cared for entirely by the female, may be carried or can flutter down to the water when they have dried their downy coats. These babies are distinctly marked and are snappier in appearance than the young of other ducks, hold themselves more erect and move about more briskly. The winter is spent north to the limit of open water; along the coasts they feed and play among the breakers during the day but seek safety in deep water off shore for the night.

GOLDEN-EYE—*Glaucionetta clangula americana*

WOOD DUCK—*Aix sponsa*

WOOD DUCK

Wood ducks belong solely to North America, mainly the United States. The male is undoubtedly our most beautiful duck. These widely distributed birds choose wooded areas where there are streams and ponds. They feed chiefly on bulbs, leaves and seeds of water plants, fruits, beechnuts and acorns, but also eat insect larvae, minnows, frogs and snails caught at or near the surface of the water. A large tree-trunk hollow serves as a nesting site within which six to fifteen smooth, ivory-white eggs are incubated. The male bird stays nearby during this time and later helps in the care of the young. The babies' sharp toenails aid them in climbing to the edge of the nest whence they are carried or drop to the ground below and are led to the water by the old bird. Wood ducks are swift of flight and swim with directness and speed. The family keeps together, migrates as a group and at night seeks protection in woodsy pools. These ducks are sometimes called tree ducks; they dwell inland and are only rarely found along the seacoasts.

GET COLOR WITH ASTERS

THEIR BRILLIANT BLOOMS BRIGHTEN THE GARDEN

BY ALBERT A. HANSEN

IN THE minds of many, the asters are confusing until it is understood that there are really two types of garden asters differing in many ways. Most popular are the summer or China asters, natives of the Orient, that are believed to be among the oldest of cultivated ornamentals, since they were grown in China for many centuries before being introduced into Europe about 1731. Strangely enough, they were not brought to America until a century later. China asters are annual plants known botanically as *Callistephus chinensis* and they are mainly summer bloomers. In contrast are the hardy fall asters, a product of the New World derived mainly from our wild New England aster, *Aster novae-angliae.* These are perennial in habit and bloom late in the season, frequently until snow falls.

Let us first consider the China asters, rivals of the sweet pea for popularity among garden annuals. Although American plant breeders were slow to realize the possibilities of this charming and colorful group, their lack during the early days was more than overbalanced by recent activity on the part of our floriculturists, since many of the best of the new varieties are of American origin. And no wonder our plant breeders have taken a fancy to this child of the Orient, since the China asters show an amazing range of flower form from the single to the chrysanthemum-like type and a color range from pure white to red. The bright blooms add a delightful touch of summer gayety and cheerfulness to any garden. On account of their great variation in both form and color and the lasting qualities of the blooms, China asters have achieved great popularity for bedding, borders and cut flowers. There are few uses to which they cannot be put.

RIVALS OF THE SWEET PEA

The China asters are most popular in the garden, and countless new varieties have been brought out

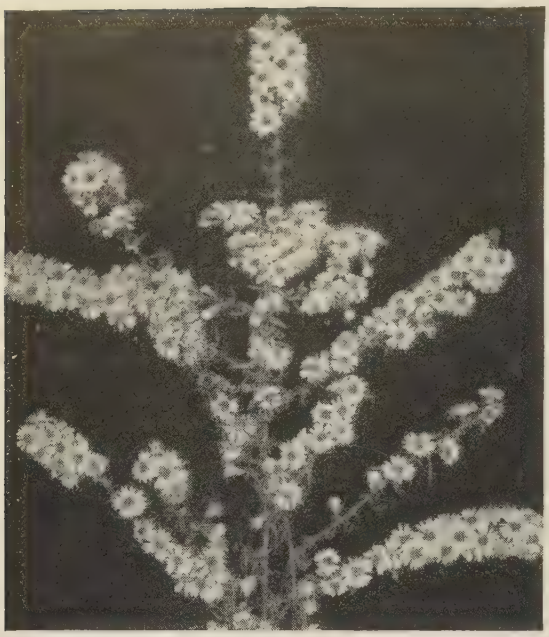
The original oriental type was a single blossom of lilac hue that was first doubled by the skill of European breeders. The catalogues of today show many fine varieties of American origin such as the superb Giant Branching forms and the wonderful new California Giant.

Among the best of the early varieties are the Queen of the Market, Comet and Rochester. Earliest of all is the Queen of the Market, a handsome variety that attains a height of a foot or better, blooms during July and produces fairly large blossoms ranging from white to pink, rose, crimson, light and dark blue. Then come the old reliable Comet or Ostrich Feather asters which have lately been vastly improved. The third popular early form, the Rochester, is a comet aster of more recent introduction, an exquisite creation with lavender pink predominating.

Among the best of the mid-season varieties may be mentioned the Royals, Daybreak, Mikado, Victoria, King and Crego, the giant form of the latter being probably the finest of American asters with the possible exception of the new California Giants with their huge curled chrysanthemum-like blossoms and bushy habit of growth. The light blue, peach blossom, dark purple, rose or pure white flowers terminate sturdy stems that attain a height of about two feet while the blossoms sometimes measure five inches across.

Most popular among the late asters are the Astermums, so named on account of the resemblance of the blossoms to chrysanthemums, American Beauty and the new Autumn Glory, a pink variety that is among the last of garden plants to retain bloom.

So rapidly is the art of the aster breeder advancing



EXCELLENT BREEDING STOCK
The wild Aster tradescanti furnishes a fine base for further experimentation

NEW BLOOMS FROM THIS
Aster spectabilis is another wildling with infinite possibilities. It is decidedly different

that attractive novelties are constantly appearing on the market. Among the interesting new flowers that bid fair to become standard is the Heart of France, a pure red variety of stable color and remarkably handsome appearance.

On account of the ease of culture and the succession of vari-colored blooms, from July until hard frost, the asters are among the most satisfactory of garden annuals. Almost any type of soil from poor to good will support a stand but the flower responds well to good soil, fertilizer, lime and proper preparation. A heavy loam enriched with rotted stable manure and wood ashes or lime, located in an open, sunny situation that is not too dry, is preferred. Fresh manure or manure in too liberal quantities is apt to do more harm than good. In general the seed bed should be prepared in a similar manner as for vegetables, spading the manure into the soil to a depth of about one foot and dusting sufficient lime to whiten the surface of the soil.

Where a succession of blooms is desired in the garden, the early flowering sorts must be started indoors during March or April. Sow the seed in a coldframe or in shallow boxes, cover with about one-fourth inch of soil and do not deprive the young seedlings of sunlight. In case the tender seedlings wilt suddenly and fall over at the ground line, this may indicate the presence of the dreaded damping-off disease, caused by a fungus. When this occurs, water sparingly and in the early morning add a layer of sand an eighth of an inch deep to the soil and thin out the stand. Or, better, treat with a solution of one of the new organic mercury compounds that may now be purchased from dealers.

About forty days after seeding the second pair of leaves expand, a signal for transplanting into small pots or deeper boxes, setting about two or three inches apart in order to give the root systems a chance to develop, which they do in amazing fashion. When warm days appear and all danger of frost is passed, transfer the young plants to the places in the garden prepared for their reception, setting them at least one foot apart so that the tops may have room to expand properly. Firm the soil around the roots of the transplants, water thoroughly and you have sent them on their way to gorgeous bloom during late July and early August. For the tall-stemmed varieties staking may be necessary. Aside from weeding with a hand hoe no further attention is required.

If you prefer not to fuss around with indoor work or transplanting, and want the production of later blooming plants, sow the seed in the open during May. The expanding of dogwood blossoms is a safe guide to the proper seeding time. When the seedlings begin to crowd each other for elbow room either thin out the stand or transplant so as to give the plants developing room. Many experienced growers believe that hardier plants are produced from seeds sown in the open, compared with the more pampered indoor products. The time of sowing seed, combined with the selection of the proper varieties, insures the succession of blooms so desirable in the garden.

The greatest drawbacks to successful aster culture are the fungus and insect pests which seem to have multiplied unduly during recent years. Indeed, so important a factor is the disease problem that it is never advisable to grow asters on the same soil for two years in succession. Most serious of the insect pests are the black potato or blister beetle and root lice or aphids. Blister beetles are black, active little fellows about a half-inch in length that usually appear when the flower buds expand and they attack all sorts of garden flowers. They are as formidable enemies to the flower gardener as their technical name, *Epicauta pennsylvania,* might suggest. The best control developed to date is dusting with sodium fluosilicate

while the plants are dry. Spraying with arsenate of lead is also helpful although some prefer simply to knock the beetles into a receptacle containing kerosene until the pest disappears.

The presence of root lice is usually indicated by a yellowish, unhealthy appearance of the foliage and general stunting of growth. If in doubt, pull a few of the stunted plants and pale blue or greenish colonies of lice can readily be detected on the roots, particularly at the crowns. Usually ants abound where aphids cluster, another indication of the nature of the trouble. To rout the lice dig out some of the soil at the base of each plant and pour in a half cup of nicotine sulphate solution, available from dealers, or of carbon bisulphide emulsion. Where trouble is anticipated, early preparation of the seed bed with constant working until the plants are set out or seeding takes place will do much to destroy the weedy vegetation that harbors the pests, in addition to demoralizing the ant colonies.

The most serious of other aster diseases are yellows, fusarium wilt, and leaf spot. Infection by yellows, the worst of all aster troubles, is indicated by the yellowing of the foliage, distortion of floral parts and an erect, stiffened habit of growth. The disease is due to a virus the exact nature of which is little understood, although it seems to be associated with the sap. It is spread principally through the agency of leaf hoppers, both from aster to aster and from a large number of garden plants, including weeds and cultivated species, that act as reservoirs of infection. To control aster yellows, destroy the leaf hoppers with nicotine dust or spray applied every week or two and eradicate the weed hosts of the virus, particularly the perennial species. Principal among these are dandelion, fleabane, horseweed, sow thistle, plantain and redroot. Among cultivated species that shelter the yellows virus may be mentioned daisies, including the Shasta daisy, pyrethrum, gaillardia, calendula, dill, anise, mignonette, sweet alyssum, California poppy and spinach.

Fusarium wilt is caused by a fungus that clogs the transportation system of the plant and is distinguished by yellowing of the leaves accompanied by dark streaks on the stem and blackening of the roots. The fungus is carried in the soil, and so little can be done after it once appears that infected soil should not be used for aster production for three or four years. Cut down on watering since moisture aids the spread of the disease. Where the trouble appears in young plants, soaking the soil with a solution of one of the new organic mercury compounds may give satisfactory results.

Leaf spots on asters can be controlled by spraying with Bordeaux mixture. Growers nowadays treat their seed with corrosive sublimate, thereby largely eliminating the leaf spot disease.

And now we come to the second great group of garden asters, the hardy, tall-growing perennial species that enliven borders and shrubbery plantings until late in the season and that are such desirable additions where a wild or careless effect is desired.

The history of these native Americans is interesting. The writings of the early colonists contain frequent allusions to the gorgeous masses of asters and goldenrods that bedecked fields and woods borders with royal purple, blue and gold in such colorful profusion as to rival the palette of an artist. The wild (Continued on page 326)

WHY ASTER GARDENERS GET GRAY

Aster yellows stunts, stiffens and turns yellow these aster plants. Nicotine is helpful. In the inset is shown the effect of wilt, a pernicious pest

NO DOCTORS FOR SNAILS

The tentacles and even the head can be severed, yet will be replaced in time

WHO CARES ABOUT DOCTORS

WHEN LEGS AND HEADS GROW ON AGAIN?

BY J. G. PRATT

ILLUSTRATIONS BY AUTHOR

WERE we humans endowed with certain physiological characteristics of some of the living creatures on this earth, the doctors would go begging and the hospitals would cease to exist for want of patronage.

Wouldn't it be fine if you could lose an arm or a leg, or in extreme cases, even your head, and instead of being a cripple or a corpse, you could just browse around home until the lost member grew out again and you were once more as well as ever?

While humans have not such powers, yet a number of species in the kingdom of the lower order of animals display kindred abilities every day.

No wonder the spider springs into action with such valor. About the worst that can happen to him is the loss of a leg or two, and he can easily get along without these until he gets new ones.

The process of regeneration or replacement of lost members, because it is of little economic importance, has been given attention by very few scientists, and practically all the data available, except for some few more recent discoveries, come from four eminent naturalists writing in 1740—Trembley, Réaumur, Bonnet and Spallanzani.

Although a large number of forms in Nature have the power of regeneration, I will only speak of those which are more or less well known. Several kinds of myriapods as well as spiders, crabs, crawfish and lobsters

NO FEARS HAS THE STARFISH

Not only will new limbs grow, but if the animal is cut into segments, each piece will form a perfect starfish

THE WOOLLY BEAR CATERPILLAR

His tribe enjoys the power of regeneration, along with the mantis and cockroach, the only other insects who possess it at all

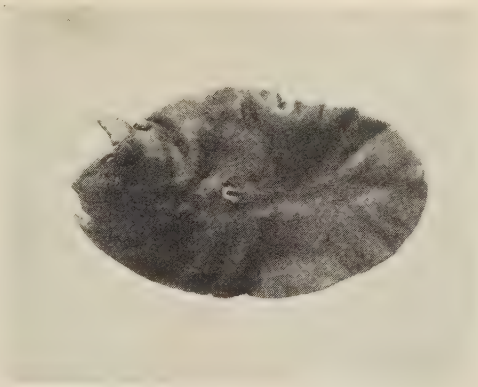
grow new legs, but only a few insects—caterpillars, the mantis and the cockroach—seem to have this ability.

In the illustration of the spider, *Araneus* (*Eperia*) *cornutus,* the immature front left leg will be noted. If Araneus had not crossed the path of the photographer when it did the limb would have developed into full size and usefulness.

With crabs, lobsters and crawfish there is a definite, smooth "breaking joint", so-called, on the second segment from the base of the leg at which the separation generally takes place in

case of injury, and this is the point at which the regeneration begins. If the leg is severed outside of the breaking joint, the animal itself throws off the rest of the leg up to that point. Tarantulas, also, which have lost a small portion of a leg, have been observed to bite off the rest of the member up to that joint.

Frogs have no powers of regeneration, although the larval tadpole can regenerate its hind-legs and tail. In fact, where its tail is cut off two tails can be made to grow instead of one. Lizards and salamanders are well known to have the knack of acquiring new tails, and it is supposed that such is the explanation of instances where freak lizards with two tails have been found.



MOST REMARKABLE OF ALL
If the flatworm is cut in half, the head grows a tail and the tail a head

GROWING A NEW FRONT LEG
The spider, Araneus (Epeira) cornutus, met the photographer just in time to show his not yet mature left limb

The earthworm can be cut into two or more pieces and each section will regenerate the missing parts. The same cuts have been made as many as twelve different times without abating the replacement power. The thirteenth cut, however, seems unlucky.

Grafting experiments have also been performed on the earthworm. Cut sections, even from different species, will grow together to form a perfectly healthy creature.

In the case of a bilobed fishtail severed at almost any point, the new part starts growing almost immediately, progressing more rapidly at the outer edges so that the entire regrowth is completed at the same time.

Jellyfish regenerate profusely, and in starfish we have a most remarkable phenomenon occurring. Not only will they replace arms which are bitten off, but the animals can actually be cut up in several pieces and each piece will develop into a perfectly formed starfish. The illustration plainly shows the immature arms that have not yet reached full growth.

In snails, the tentacles and even the head itself can be severed, and in time replaced.

But about the queerest of all Nature's progeny is the lowly flatworm. This animal resembles nothing so much as a small cutting of calf's liver, and in spite of its frequent occurrence along the shores of lakes and streams all over the world, is seldom seen except by naturalists or in museum collections.

If it is cut in two and placed in a bowl of water, both halves continue the forward gliding motion; in time the head grows a tail and the tail grows a head. If severed just back of its head, however, another head is regenerated and the double head carries on as a living creature. The reasons for these queer workings in Nature we know not; we merely know that they exist.

But the flatworm has other peculiarities worthy of note besides its powers of regeneration. It glides over the surface of the water without showing so much as a ripple of muscular movement, and this is accomplished by a layer of sticky mucous slime in which its cilia beat, causing the forward motion. The cilia are short hair-like spines on the underbody and from their shape it is evident that a backward motion is impossible. On solid

ANGLEWORMS ARE VERSATILE
If cut in two, each section regenerates the missing parts, and segments from different worms will join to form a healthy individual

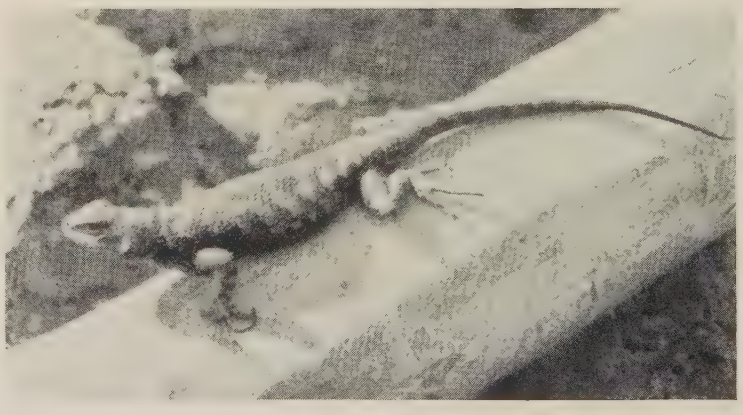
THE PRAYING MANTIS

Who preys on many other insects, secure in the knowledge that if it loses a leg, another will take its place

TARANTULA THE BOLD

If a small part of a limb is injured, the creature will bite off the rest up to the breaking joint, to aid growth

substances, however, it can crawl forward or backward, using for this purpose a muscular contraction of the body. If turned over on its back the animal flops its head over, the cilia thereon start the forward gliding motion and gradually unwind the spiraled body.



HE THINKS NOTHING OF LOSING A TAIL

Because, being a lizard, he will quickly grow another one, and sometimes two appear

Birds can reproduce the horny parts of their beaks and claws, if these be broken or cut beyond the core of bone that supports them. This process, however, can not be considered to be regeneration, in the same sense as is the growing of a new limb. The parts repaired are growth of the skin, and the process is thus analagous to the replacement of the finger or toe nails in the mammals. So the higher vertebrates are without this power that some of the lowly creatures find so useful. Which proves that to be low in the scale of life has its advantages and its compensations.

OUR TEXAS ISSUE

As previously announced the December issue of Nature Magazine will be devoted to the Lone Star State, describing it as we have done for California, New England, Florida, and the Upper Lake States. Beginning with a fascinating broad picture of Texas by J. Frank Dobie and continuing with articles on ranches by J. Evetts Haley; mammals by Vernon Bailey; birds by Bessie M. Reid; gardening by Bertha McKee; wild flowers by B. C. Tharp; fishes by G. A. Seel; forests by E. O. Siecke; and including articles on the Lower Rio Grande and the Big Bend, this issue will picture Texas as well as possible between the covers of one issue of a magazine.

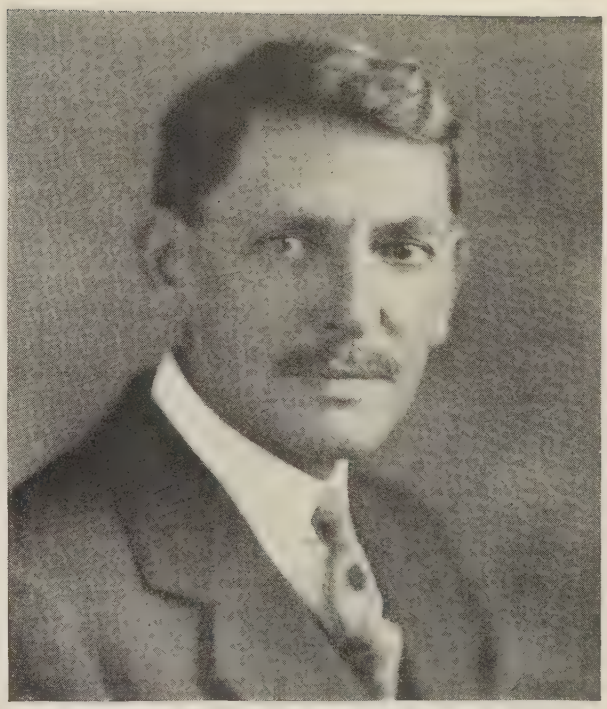
Orders for extra copies should be placed in advance of publication

PAUL BARTSCH

EXPLORER OF THE OCEAN'S DEPTHS

BY ALMA CHESNUT

The Editors are gathering together an interesting series of short articles on the Nature hobbies of men and women whose regular vocations are along very different lines. This series will start in an early issue. Meanwhile here is another story about one more distinguished member of our Scientific Consulting Board



DOWN TO THE SEA WITH A HELMET
Washington's brilliant scientist, Dr. Paul Bartsch, knows the deep better than Davey Jones

"IT WAS on board the *Albatross* in the harbor of Jolo on a dark night with the sea as smooth as glass, and we were fishing with the submarine light. . . ."

Dr. Paul Bartsch, explorer of the deep, is about to recount one of his adventures. And if the prelude has the arresting effect of a sailor's yarn remember that the sea, his domain, has ever been the symbol of mystery and high adventure; that none who know it may thereafter escape its allure or turn a deaf ear to its seductive whisperings. It fascinates the scientist most of all, perhaps, for it holds the key to that mystery of mysteries, the dawn of life on earth.

"A swish or two of the light," Dr. Bartsch continues, "and a raising or lowering of it at once attracted a cloud of minute forms; then larger elements came, in part attracted by the light and in part by food. The protozoans accumulating about the globe were soon followed by worms and crustaceans, whose tangential course would soon have carried them beyond our light were it not that the fascination curves them more and more and apparently renders them unable to escape the charm that draws and bends their path to spin about the globe.

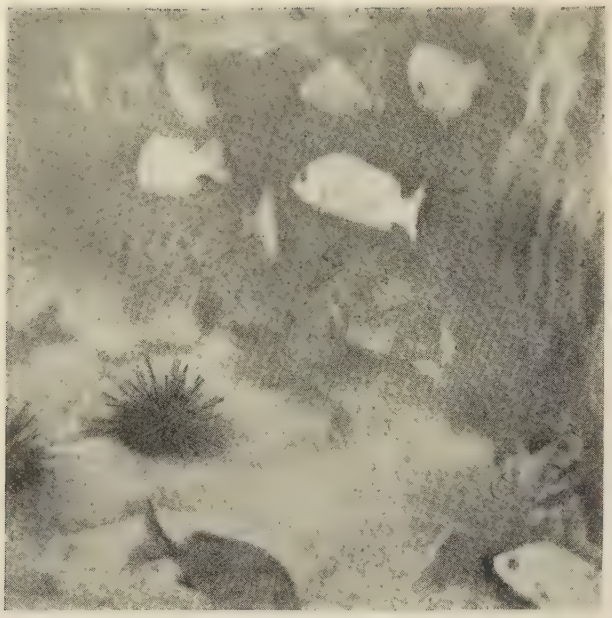
"We soon found millions of creatures drawn into a spinning vortex about our light. But new members were soon added; small fish of various kinds, a school of sardines dashing madly after the small crustaceans and worms, and still larger and larger fish at greater distances from the light, always preying upon the lesser circle within; now and then even the shadowy outline of a large shark injected itself into the distant reaches of our lamp. It was a mad dance, this whirling circling host of creatures.

"Soon a new element entered; living arrows, a school of Loligopsis shooting across our field of vision, apparently not so much attracted by the light as by the feast before them. They were wonderful creatures, unlike anything else; they shot forward and back with lightning rapidity and were able to divert their course in any direction with equal speed. Never before or since have I seen anything that appeared to me more beautifully equipped for an aquatic existence than these squids.

"Turn off the current and where a moment before we had seen a mass of circling life, we now had a glowing whirlpool, each spark an atom of life, while bright phosphorescent streaks marked the movement of the larger forms, themselves luminous or rendered so by exciting their smaller neighbors to flash as they came in contact."

The setting of this vivid picture was the Sulu Sea in the Philippines where Dr. Bartsch was cruising during the summer of 1907. He had then been a member of the National Museum staff of scientists for thirteen years and at the age of thirty-six held the important post of curator of the collection of marine invertebrates. The instrument he was using to attract the swarming life of the tropical sea within reach of his nets merits closer examination. It is a simple contraption of the scientist's own invention and typifies that ingenuity which has made possible many of his most intricate studies and helped extend the world's knowledge of deep sea life. A sixteen candle-power electric bulb has been encased in a glass globe and connected by a water-tight cable.

The submarine light made it easy to scoop up the teeming sea life—forms of every conceivable size and shape, from funny little octopuses with great staring eyes, fish and crustaceans to those microscopic forms upon which other species feed—for examination in the laboratory. But laboratory methods reveal only one side of any picture. The scientist must view his problem from all angles. So we shall follow Dr. Bartsch on one of his "deep sea rambles", eight fathoms down, across the ocean's floor where the life is varied and strange.

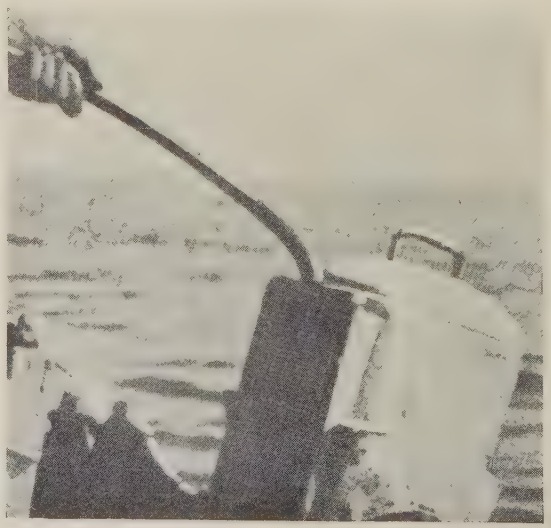


GRAY SNAPPERS AT HOME
Photographed under water by a camera of the scientist's invention

Even in tropic waters a person becomes chilled after about an hour of undersea work, but our scientist often rambles about for several hours for he has long since hit upon a trick to overcome the handicap of cold. Before "channel swims" had popularized grease coats he had noticed that the Filipino divers greased themselves with oil. He borrowed the idea. Before donning his clothes, he has a brisk rub-down with olive oil. Then the heavy bell-shaped helmet, equipped with about two hundred feet of hose, is slipped over his head and he descends slowly until he feels soft sand beneath his feet. He never uses the familiar "diving suit" because it interferes with his freedom of movement. He considers the bell-shaped helmet safer because, he says, if anything should go wrong with the hose, all he would have to do would be to slip out from under his "hat" and come up.

The land upon which he opens his eyes is unlike any that could be imagined—it is a looking-glass land where everything is different and queer. There are rosy growths of horn and fan coral, perhaps a massive coral reef, strange aquatic plants that, on land, collapse into mere wisps of green scum, losing all their airy loveliness; shells tinted like delicate flowers; funny, prickly little sea urchins and bright-colored fishes.

It was, in part, a desire to bring some conception of this wonderland of haunting beauty within the view of others, coupled with a passion for Nature photography, that led to the invention of the undersea camera, another of the scientist's "simple contraptions" which he employed successfully for the first time in 1912. It consists of a metal case with a glass window in front of the lens. Rubber gaskets are fitted into the seams to make it water-tight. A similar case is used for the undersea motion picture camera, which Dr. Bartsch also perfected.



WHO IS UNDER THE HAT?
None other than Dr. Bartsch, on his way to find new wonders of sea life

Aside from the task of identifying and cataloguing the thousands of shells, corals, and helminths, or sea worms, Dr. Bartsch, as curator of the National Museum collection, has conducted original studies of great importance. It is difficult for most people to realize that human life can be jeopardized by queer little slug-like creatures, living in shells in pools, lakes and streams; that a mollusk could be the instrument of saving countless lives in war, or that fortunes could be made or lost through knowledge or lack of knowledge of these strange forms. Dr. Bartsch, however, knows that these statements are true.

The Who's Who summary of his career briefly mentions that he furnished a poison gas detector to the Chemical Warfare Service. Few would guess that the "detector" was a species of land mollusk familiar to everyone, the ordinary, garden variety of slug that causes chills to run up and down sensitive spines. Dr. Bartsch generously divides honors for the discovery of his gas detector with a pet Carolina parrakeet.

"I was raising the slugs in a glass cage," he says, "and the parrakeet dropped an apple on it so that they escaped and got all over the house. In gathering them up I noticed that they seemed very sensitive to odors and began to experiment with them. They showed their dislike for mustard gas by pulling in their little tentacles when one part of the gas was diffused in twelve million parts of air. The gas is not dangerous to man until it has reached a concentration of one to four million parts. When this was attained they would roll all over themselves and close their breathing pores."

Garden slugs, then, were responsible for saving thousands of lives during the World War. They are native to Europe and all a soldier had to do to secure a detector was grub around a bit in the rubbish behind the trenches. The slugs were kept in little cages with a wet sponge and since they were able to stop breathing in emergencies, they served for indefinite periods. Some were gassed as many as twenty times without sustaining injury. When the observer saw them roll over and over in convulsions and exude a creamy liquid, he quickly gave alarm and gas masks were donned.

Other mollusks, says Dr.

Bartsch, are less altruistic. They serve as intermediate hosts for flukes, tiny parasitic worms that infest man's blood, lungs, liver, intestines and other parts of his body, causing serious diseases. After developing in the mollusks, the flukes float around in the water, then attach themselves to objects used as human food, such as Chinese water-nuts, small crustaceans and fish of certain species. Through these they are transmitted to man.

Since ancient times ship worms have caused losses aggregating millions of dollars to ship owners by burrowing into wooden-bottomed vessels and destroying piles, yet they seem to have been accepted as a necessary evil for centuries. Few systematic studies had been made of them until Dr. Bartsch undertook to classify the various species and find a means of ending their depredations. After extensive studies he was able to announce finally the discovery of a process, which he has patented, that protects wood from these pests. So much for saving a fortune through knowledge of the deep.

One of the most intricate experiments Dr. Bartsch has performed was to determine the effects of heredity and environment on a species of mollusk known as the cerion. The cerion, though similar to species found in the sea, is a land mollusk having a cone-shaped shell about an inch or an inch and a half in length. The size, shape, coloring and sculpture of the shells differ widely in various parts of the world and the object of the experiment was to find out, if possible, what factors were responsible for these variations.

The experiment was begun in 1912 and, though it is still in progress, many facts of interest to science have been ascertained. During voyages to the Tortugas, Bahamas, Cuba, Porto Rico and Curacao, Dr. Bartsch collected cerions, transplanting them to the Florida Keys. Each species was kept separate and after several years it was found that they had not altered their appearance in any way. Environment, then, was ruled out as a factor in their variation.

LIKE CONVICTS OF THE DEEP

Horizontally striped Tortugas flock about the undersea lamp, drawn by its powerful rays

SEA LIFE FIVE FATHOMS DOWN

They swirl and dart in brilliant display, revealing new secrets of the waters

A BANDED NIGHT HERON

Since 1902, when Dr. Bartsch was a pioneer, more than 450,000 birds have been marked

Next Bahama cerions were crossed with the Florida species. The offspring, or hybrids, were all alike, but differed in appearance from both parent species. This uniformity, however, disappeared completely when the hybrids were crossed, a generation of cerions being produced no two of which were alike. They were of assorted sizes and their coloring and markings differed widely. Dr. Bartsch therefore concluded that interbreeding alone is responsible for variation. His conclusions parallel those of other scientists who have experimented in breeding plants.

Dr. Bartsch was born in Silesia, Germany, and comes of a family that has produced many distinguished scientists. He came to the United States as a small boy in 1882, living first in Missouri, then in Iowa, where he was graduated from the State University. In 1896 he joined

the brilliant National Museum staff.

One of the most alert scientists in the Nation's Capital and one of the busiest, Dr. Bartsch's activities carry him into diversified fields. He is an ardent ornithologist and was one of the first in the United States to band birds with the object of tracing their flights. As an editor and author he has more than three hundred scientific and popular articles to his credit. He is Professor of Zoology at George Washington University and director of the histologic laboratory and lecturer on medical zoology at the Medical School of Howard University.

The list of scientific and civic organizations to which he belongs, and in a surprising proportion of which he has held important offices, attests to the broadness of his field of activity and his truly remarkable range of interests. Geology, Paleontology, Ornithology, Botany, Microscopy, Anatomy, Humane Education, Conservation—all these and others have claimed a share of his attention. And as if that were not enough to keep him occupied he is an active leader in the Boy Scout organization in Washington.

PURSUING A HOBBY

Dr. Bartsch is at home on land or under sea, and is looking for birds right now

However busy his winter program, every spring you will find him clearing up his desk, eager as a boy to be up and away to sea. The cameras, the nets and other impedimenta are packed, and he is off to the Philippines, Curaçao or Asia to add new specimens to his collections and new knowledge to his remarkable fund of deep sea lore. And when he returns he has new marvellous stories to tell—stories a Conrad or a Melville would delight to write for an interested world.

A BIG MUSHROOM

BY W. E. SHERWOOD

HOW MANY STEAKS COULD IT SMOTHER?

This specimen of Lentinus lepidius, an edible mushroom, weighed seven pounds and a half and was sixteen inches across. The lad at the left seems to be calculating just what will be his share when mealtime comes.

How is this for a big mushroom? It weighed seven and a half pounds lacking but half an ounce, was sixteen inches in diameter and forty-nine inches in circumference. What a meal it is going to make for some hungry family.

This species is known to scientists as *Lentinus lepidius,* and is edible, though old specimens may be quite tough. Except for the giant puffballs, there is probably no other kind of mushroom which ever grows to such a size. One mushroom of this species is known to have reached a weight of twelve pounds, but such specimens are rare, and lucky is the person that finds them.

This mushroom was found growing from a sugar pine stump, near the Rogue River in Oregon. The stump was right beside a small stream which, by furnishing it with plenty of moisture, probably accounts for the enormous growth. The young lad holding the evening meal appears to be thinking of just how many pounds of steak his prize will smother.

TREE BUTCHERY

HOW TO PROTECT TREES FROM IMPROPER PRUNING PRACTICES

BY CLARENCE E. BAKER

PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

THE LOSSES caused by the improper pruning of shade and fruit trees each year would be exceedingly difficult to estimate, but if summed up, they would be nothing short of astounding. The sad part of this is that nearly all such destruction could be avoided by exercising a reasonable amount of care and forethought.

It is true that most of our fruit trees and some of our shade trees require a certain amount of pruning, but in too many instances the pruning is overdone. Many fruit trees have had their productivity seriously reduced or postponed by too heavy or injudicious pruning, especially during the early years in the life of the tree. In like manner many old fruit trees, neglected for years, have suddenly fallen victim to the enthusiastic tree pruner who attempts to make up for the neglect of previous years by the removal of many large branches. The result may be the sun scalding in the inner part of the tree, of limbs that, having been shaded from the direct sunshine for many years, are in no condition to withstand the heat and light to which they are suddenly exposed. The limbs are injured, insects and diseases enter through the injured tissue and in a short time the tree may be ruined.

AMERICAN ELMS RUINED FOR YEARS

The tree butcher got in his hand on this "job". Many cities show such havoc as this

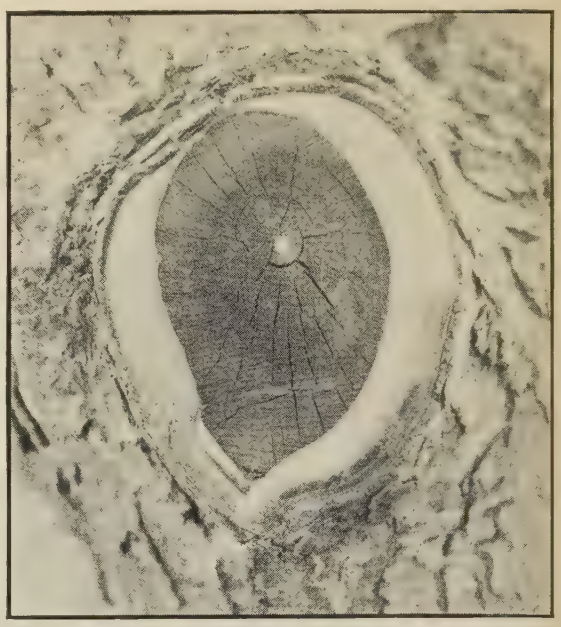
Shade trees also fall victim to the over-enthusiastic tree pruner. It is not an uncommon sight to see a tree so misshapened by pruning that it appears to belong to an entirely different species. Most shade trees have desirable natural forms when grown for the purpose for which they are suited, and require only enough pruning to keep them symmetrical or to aid them in conforming to their natural shape.

A great deal of harm has been done in many communities by the "quack" tree pruners who gain a livelihood by going from house to house informing the occupants that their trees are in need of attention. Frequently these men are wholly uninformed or seriously misinformed regarding the underlying principles of tree pruning. In any case they generally work by the hour and in order to make a greater remuneration, they remove from each tree more wood than it should be called upon to sacrifice. The term of "tree butcher" is properly given to this type of individual who ruthlessly and carelessly cuts and saws his defenseless victims.

Another form of tree butchery is that practiced by telephone and power line companies upon the trees that interfere with their lines. In spite of state laws and city ordinances this type of butchery still goes on, ruining many trees each year. The amount of pruning necessary to prevent interference with such lines could in many instances be accomplished without harm to the tree and with little effect upon its beauty. Unfortunately the men assigned to this work generally have little knowledge of tree pruning or care little for natural beauty, with the result that they maim and deform the tree much more than the occasion demands.

A further source of loss in tree pruning is through the making of improper pruning wounds when branches are removed. No one would expect a surgeon to make a rough or jagged wound when performing an operation as it is well known that to heal properly a wound must be smooth and clean. Yet it is a common practice to chop branches from trees with an axe and expect the wound to heal over. In removing branches from trees a sharp saw should be used for branches more than one-half inch in diameter in order that a clean, even cut may

NATURE TENDS TO HER WOUNDS
A well-pruned cut soon covers over, keeping out parasites and decay



THE HEALING PROCESS STARTED
The cambium cells at once begin their work of protecting the heart wood

be made. Such cuts should be made parallel with and as close as possible to the limb from which the branch arises, in order that no stub or shoulder be left. Such a wound heals quickly and protects the inner parts of the tree from the invasion of parasites as well as from drying out. Small twigs and branches may be removed with pruning shears or a sharp knife, leaving a smooth, clean surface.

The manner in which Nature heals her wounded trees is very interesting. Just beneath the outer bark of the tree, which is composed chiefly of dead cork cells, is a thin section of living material and beneath this is a layer of rapidly growing cells known as the cambium. It is from this cambium layer that growth in the size of the branches takes place. When the branch is injured or wounded the cambium begins the formation of a soft, rapidly-growing tissue on or below the wounded surface. This tissue is known as *callus* or *wound tissue*. The outer cells soon become corky and finally a protecting bark is formed beneath which the complete healing of the wound goes on. If conditions are right this healing takes place rapidly so that in a few months a small wound is again covered with bark. The length of time required for complete healing depends upon the size of the wound and the vigor of the tree. Some wounds require several years to heal over completely.

RESULT OF IGNORANCE
Heart wood rot entered the tree through the stub left in pruning

As it is impossible for callus to form over the end of a stub it is imperative that the wound be made close to the main channels of food transportation. These are parallel to the cambium layer. In the case of the death of a pruning stub it is not unusual to see the callus formation extending from the living tissue at the base out along it for some distance, in a vain attempt to cover over the entire stub; but this feat is seldom accomplished. As stubs left in pruning are of no further use to the tree and as they are cut off from a supply of elaborated plant food they generally die or become infected with wood rotting fungi which not only consume the stub but use it as a means of entrance into the main body of the tree. This may result in the consuming of the heart wood, causing a hollow tree that lacks the strength to withstand wind or storms.

Needless injury to trees is often caused by stripping of the bark when removing a large limb. Such a limb, being heavy, often breaks before being sawed completely through and tears off with it a long strip of bark as it falls to the ground. This may be avoided by first sawing off the limb several feet from the main trunk and then removing the stub close to the trunk in the proper manner. On limbs of medium size the same thing can be accomplished by making a cut about half way through the branch from beneath upward and several inches from the main trunk and then removing the branch close to the trunk. The first cut reduces the

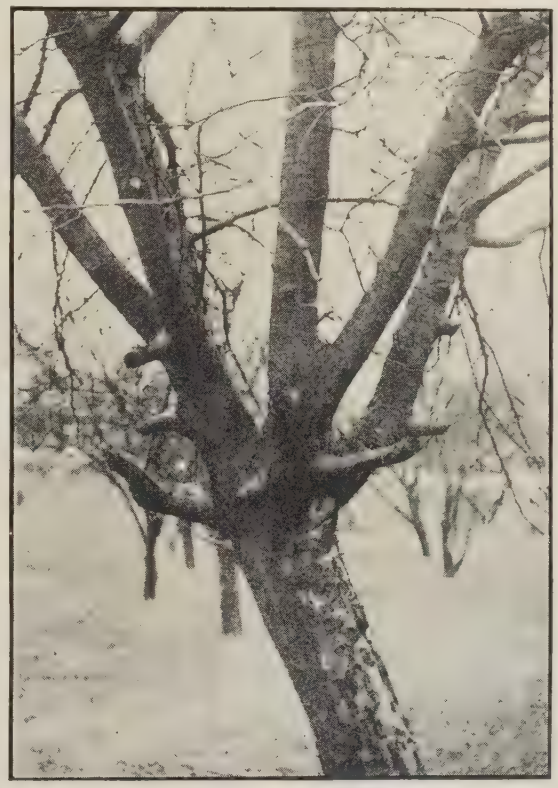
danger of splitting so that the limb may be removed without tearing the bark.

If the wound is of such a size that it will not heal over in one season the exposed wood should be painted to protect it from rotting or drying out. For this purpose a thick lead and oil paint tinted to match the color of the tree is desirable. It is customary to permit the exposed wood to dry out slightly before painting to secure better penetration, as the paint will not stick if the sap is flowing.

These precautions are carefully followed by competent tree surgeons and those who make a study of tree growth. If they could be put into more universal practice the results would be very gratifying and an important step in the conservation of our natural wealth and beauty would be accomplished.

A FUTILE TASK OF GROWING
The bark vainly tries to cover the improperly cut stub

Another form of abuse that trees and plants must withstand from well-meaning but ignorant friends is untimely pruning. Evergreens demand spring or early summer attention, just subsequent to the time when new growth stops. Shade or ornamental trees may be cared for at any time if flower production is not to be considered. Young fruit trees are pruned when the terminal buds are forming on the ends of the shoots, if thickening is the motive; but summer pruning is best for balance. Summer attention favors fruit bud formation while winter cutting back causes branching, but as the leaf area is reduced by the removal of limbs in the summer, the trees are weakened rather than strengthened. Study your tree before starting to prune it.



DO NOT DO THIS TO YOUR TREES
Long stubs cause the loss of many fruit trees, as they admit wood-rotting fungi into the heart

The ornamental flower plants need the knife and shears only after flowering. The spring bloomers should be attended to within a week after the blossoms fall; the summer plants may be cared for either in autumn or in the spring just before growth starts. Vines may be pruned during the dormant season.

It is frequently necessary to study the individual tree before intelligent pruning can be done. If the tree spreads too much, cut the outside buds; if its branches are too high, prune to the upper buds. In the case of fruit trees, shortening the boughs will compel bearing. Excurrent trees, such as oaks, birches, spruces and sugar maples, should never have the leader removed except for good cause, since its replacement is very difficult.

The day of the tree-butcher is drawing to a close, it is to be hoped. The principles of proper pruning are clear and simple enough for every home-owner to learn and follow them. The beauty of the cities and the towns of the United States will be greatly enhanced by a little more careful cutting, and less optimism on the part of those civic authorities who feel that any man with a saw, knife and dump wagon is capable of attending to those mute citizens that have enriched the community in some instances for the past three hundred years.

Ed. Note—Particularly unfortunate are some of our leading Eastern cities in the type of work that is done along the streets and in the parks. Washington, the Federal City, noted for its trees, suffers along with the others from tree butchery. Only a few days ago the "clean-up" squad charged up and down Sixteenth Street, removing dead branches from the tulip trees, doomed by the tulip scale, and leaving stubs that will not heal over. Earlier in the year, the group of "tree surgeons" invaded Rhode Island Avenue to remove the tops of several beautiful shade-givers which have not recovered from the shock. The fault undoubtedly lies in the fact that the treasury purse strings, though loose enough to provide $300,000,000 for a beautification program, are too tightly drawn to permit the hiring of properly-trained men, who will zealously guard the already existent beauty.

Trees, as good citizens, deserve the best. They are the chief assets of a beautiful community, and penny-wise—pound-foolish economics should not be practiced where they are concerned.

THE HAARTEBEESTES RUN BEFORE THE CAMERA
But the warthogs, found at their drinking hole, would make it very unpleasant for the photographer if they were so minded

These fine pictures of South African wild life are the work of Mr. Herbert Lang and were taken in the wonderful Kruger National Park. This great game sanctuary of the Union of South Africa covers an area of 7,816 square miles, its greatest length being 220 miles and average width about 40 miles. Within the borders of the park is found a wide variety of large and small mammals, a great bird population and a profusion and variety of wild flowers.

DENIZENS OF SOUTH AFRICA
The huge rhinos, caught in the African bush, and the noble-looking male waterbuck are both to be seen in Kruger National Park

A MASS MEETING OF THE DAINTY IMPALAS

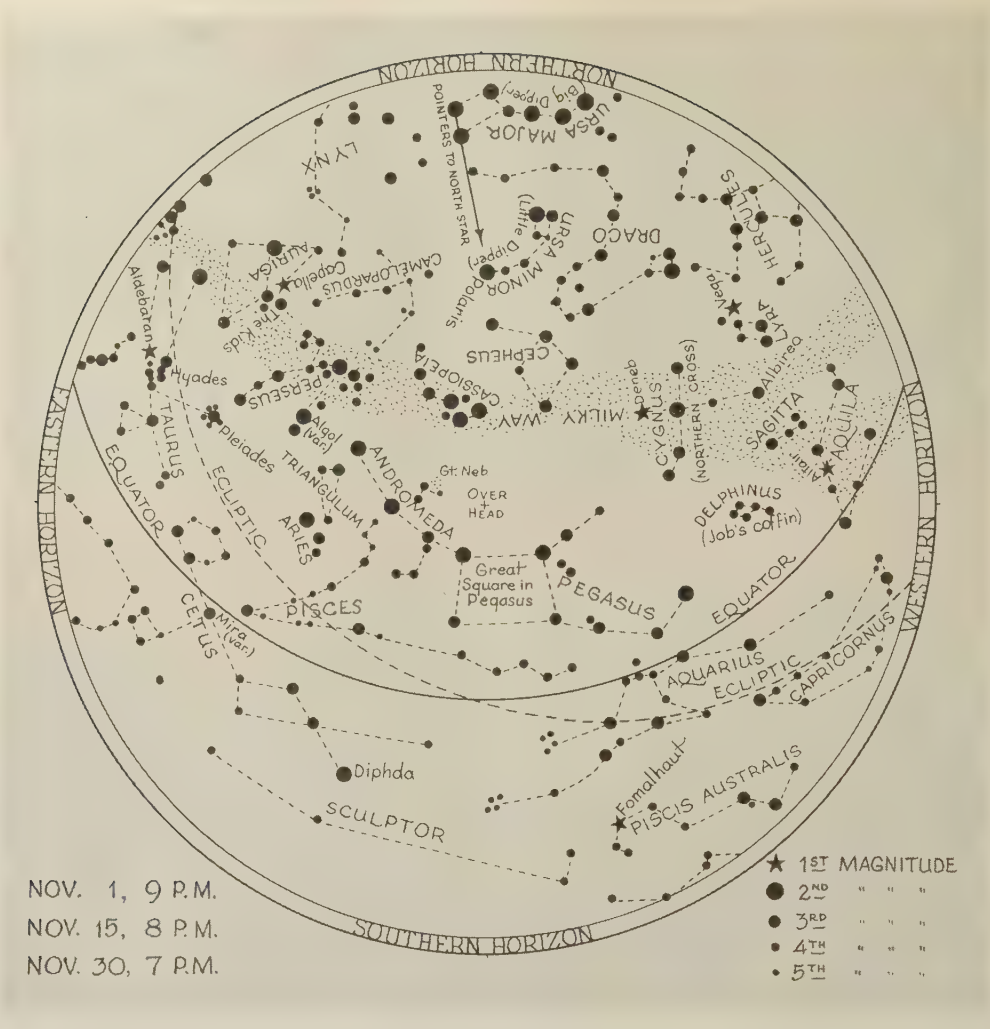
Distantly related to the American antelope, these animals are among the most exquisite and graceful of Kruger Park natives

THE PERSONIFICATION OF PECULIAR MOVEMENT

Something has captured the attention of the giraffe quartet, but soon they will be loping away with an awkwardness not elsewhere equalled

THE MUCH-FREQUENTED DRINKING HOLE

Here gather friends and enemies, the victims and the beasts of prey. The baboons in the background seem chary of advancing while the two female waterbucks and their lord, the male, are imbibing



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

EROS NEARS THE EARTH

TINY ASTEROID TO PLAY IMPORTANT RÔLE THIS WINTER

BY ISABEL M. LEWIS

MANY telescopes will be trained on the heavens this winter with one major purpose, that of obtaining observations of one of the tiniest objects in the solar system. The cynosure of astronomical eyes will be the little asteroid Eros, which has the distinction of coming, on rare occasions, closer to the earth than any other member of the solar system except the moon and such small fry as meteors, meteorites and, rarely, a comet.

In 1898 a photographic plate disclosed Eros. Investigation followed, showing that this asteroid four years before had come within less than 14,000,000 miles of the earth. It was discovered that it would not again come nearly as close and in such favorable opposition until 1931, despite the fact that the asteroid makes a revolution around the sun in a period of one and three-quarter years and comes into opposition every two and one-third years. So here it is nearly 1931 and telescopes will look at Eros.

This tiny world is only about fifteen miles in diameter and its light is variable in a period of about five hours during which there are two maxima and two minima of light. In the year 1901 when Eros came within 30,000,000 miles of the earth there were times when its greatest brightness was about three times as great as its least brightness and then again times when there was no variation in brightness. If the change of brightness were due to a difference in the reflecting power of different portions of the surface of the asteroid the variability of light would depend upon the angle at which the rotating surface of the planet was seen from the earth. It was found that the variation in brightness was great in 1903 and scarcely noticeable in 1907. Since that time the asteroid

has been very unfavorably placed at each return to opposition until this winter when on January 30 it will come within 17,500,000 miles of the earth. The asteroid will be in opposition to the earth on February 17, but its nearest approach to the earth comes about eighteen days earlier. There will be no such favorable opposition again until the year 1975.

The great value of Eros to the astronomer is due to the fact that it affords him an opportunity to get a very accurate determination of the length of his celestial yardstick, the distance from the earth to the sun. This astronomical unit is determined from the value of the "solar parallax", which is, simply, how large the radius of our own planet Earth appears in angular measure at the distance of the sun. Observations of Eros made at a close opposition, such as occurs this winter, give a very accurate value of its parallax. They reveal how large the earth appears as seen from Eros. Since the orbit of this asteroid is known very accurately from a large number of observations made at different near approaches to the earth, it is possible to find from these measurements of its parallax the scale of the solar system in miles.

Eros is the most valuable object in the solar system to use for this purpose, not only because it comes so close to the earth but because it appears as a small star-like object in the telescope. It is far easier to make good settings with the telescope upon a small point of light and so accurately determine its position in the sky than it is to observe the position with accuracy of such a large body as the sun or moon. In the coming campaign for securing observations of Eros, and so indirectly of the solar parallax and astronomical unit, every observatory will take precaution to secure the best series of studies possible. Many suggestions and plans for cooperation in these observations have already been made and published, and when this little body swings in toward the earth it will find a battery of powerful instruments trained upon it. Its position will be recorded upon the photographic plate from hour to hour through the cooperation of observatories all around the world. Its peculiar light variations will be studied carefully, for their cause is not clearly understood as yet, and soon after it has passed on beyond the reach of searching telescopes the astronomer will have a large and valuable series of observations with which to work. The attraction of the earth upon the little world will also be so great that from the "perturbations" that result in the motion of the asteroid it will also be possible to find a better value of the mass of the earth compared to that of the sun. This value likewise leads indirectly to a check on the distance between the two bodies. And so all astronomers are waiting for the little object, no larger than a fair-sized mountain, which, dropped in one of our largest lakes or bays, would appear only as an interesting island. It little realizes, as it heads toward our planet Earth, the commotion it is causing.

Ordinarily Eros appears as a faint star visible in a moderate-sized telescope but late in January and early in February it will be as bright as a star of the seventh magnitude, too faint, however, to be seen with the naked eye, since a star of sixth magnitude lies at the limit of visibility. An opera glass will find it if one knows just where to look. When nearest to the earth, at the end of January, it is moving so rapidly that in a single night it passes over a distance equal to the diameter of the full moon. On November 1 it is in the constellation of Lynx in the northern sky southwest of the bowl of the Big Dipper. On November 30 it is still in Lynx but approaching Leo Minor, through which it passes in December. In January it will be found in Leo until near the date of its nearest approach to the earth, January 30, when it will be found in Hydra about midway between Crater and The Sickle in Leo. During February it moves rapidly southwestward through Hydra. Its southward motion from November to March is very rapid for on November 1 it is about 48° north of the equator and on March 1 24° south of that line. At the time when observations of it are most valuable it is very fortunately placed close to the equator between Leo and Hydra where it is seen to advantage from all observatories in both hemispheres at night.

When farthest away, at aphelion, Eros is more than 165 million miles from the sun or nearly 25 million miles beyond the orbit of Mars. At perihelion distance, when nearest the sun, it is at a distance from the sun of about 105 million miles and its least possible distance from the earth is about 13,800,000 miles. It has been suggested that the variability of its light may be due to the fact that it consists of one or more small masses revolving around one another nearly in contact but it is more probably due to irregularities of the surface and change in inclination of the surface to the earth. In November Eros will be as bright as a star of the ninth magnitude, and will be visible in a small telescope. One should be able to detect it by its motion, very noticeable in a single evening, with respect to nearby stars. This motion is characteristic of all members of our solar system and increases as the body approaches the earth.

Among the stars and planets this month we find the Great Square in Pegasus southwest of the zenith, Cassiopeia on the meridian above the pole, Cygnus high in the west and Perseus, Taurus and Auriga conspicuous in the east. Orion and Gemini are rising on the eastern horizon; the Big Dipper is not seen to the best advantage at this time as it rests nearly on the northern horizon. Fomalhaut, in the Southern Fish, is now visible in the southwest and Diphda, the second magnitude star in Cetus, The Whale, stands alone in a region of few bright stars in the south.

Venus is not well placed for observation this month. On November 22 it is in inferior conjunction with the sun and after that becomes a Morning Star.

Jupiter rises about nine o'clock on the fifteenth and is conspicuous in Gemini.

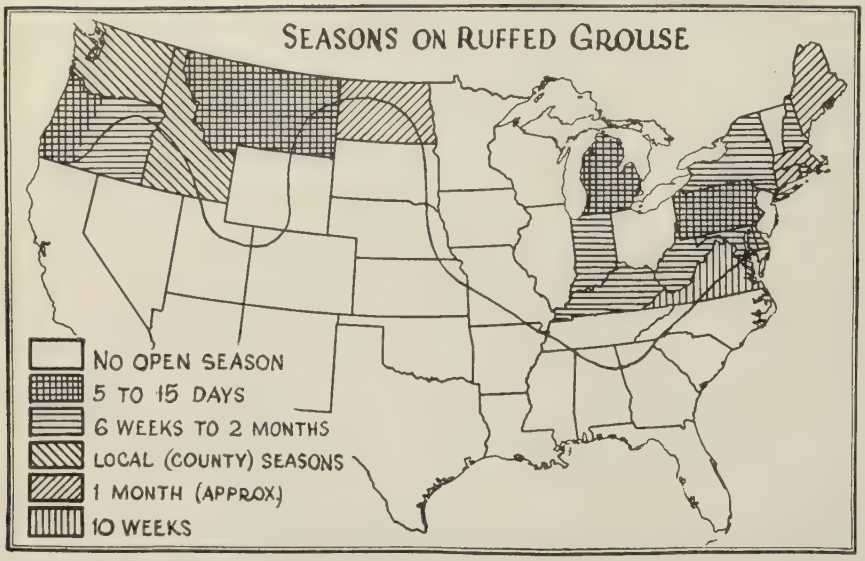
Saturn is in Sagittarius and sets about two hours after the sun on the fifteenth. It is too low in the southwest to be seen to advantage this month.

Mars is in Cancer and rises about ten o'clock in the evening on November 15. It is now as brilliant as Vega and may be easily recognized by its reddish color.

Mercury is too close to the sun to be seen this month.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION
FROM VARYING ANGLES



The Ruffed Grouse in 1930

The ruffed grouse is a bird so beautiful that it is well occasionally to take stock of its condition. Note on the map above the line that marks its approximate southern limit in the United States. Close to this line it has never been really abundant but over the whole or a part of about forty states it was originally a common species.

Of the eighteen states that this year forbid the killing of ruffed grouse, North Carolina, Georgia, Alabama, Kansas, Nebraska and South Dakota have relatively little suitable territory and never had many grouse. Vermont, Ohio, Illinois, Missouri, Wisconsin, Minnesota are among the states where it was originally abundant. The fact that in these states its killing is forbidden proves that its status there is precarious; in some of these it is almost extirpated from over-shooting.

In the remainder of the states the grouse has an open season varying from a few days to three months. These states fall into several groups as is indicated by the symbols. In a few cases the seasons as given represent only the approximate period, or there are county exceptions. To represent each season in precise terms would make the map too complicated.

Now a few words as to these seasons. To anyone even reasonably familiar with the subject, it will be evident that, while the closed areas are indicative of scarcity, the open seasons do not necessarily mean abundance. They merely show that there are still some ruffed grouse in that state, and that, the sportsmen having assumed the right to say what shall be done with the birds, the legislators allow a season that will in a measure satisfy those who have bought hunting licenses. So many factors affect legislation that it may almost be termed a matter of accident. Thus, New Hampshire, where the grouse is now by no means abundant, allows its shooting during October and November, while of the states on either side, where conditions are closely similar, one closes the season, and the other allows an open season during October. Michigan has maintained a short open season for several years, closing in 1927 and 1928, and this year in the Upper Peninsula. In North Dakota grouse are local only. Montana has much good grouse country but we are informed on good authority that the birds are becoming rare. In Idaho and Washington the counties provide such open season as seem justified. Oregon has different seasons east and west. In the eastern states generally, a relatively long season is allowed; in Virginia, a poor grouse state, there is a ten-week season, with local exceptions.

What shall we gather from the facts stated, and the map? May we not conclude that in most of our states where grouse still occur the seasons are arranged to suit the hunter, rather than the needs of the bird? In many quarters, indeed, the impending passing of the ruffed grouse is admitted.

This bird is typically North American, beautiful in plumage, harmless in habits, and interesting in many ways. Like all our birds it has its natural enemies and diseases. It plainly cannot stand the persecution that it now has to bear. To one who loves it alive in the woods, strutting or drumming, or guarding its young, it seems to deserve a better fate than extermination by the gun. If it goes, will the fleeting gratification of killing the last few pay us for the loss of so beautiful a species?

Predatory Birds and Game

Close students of hawks and owls have long insisted that the effect of these birds on game was not altogether destructive. Additional proof in support of this view appears in *Nature* (London) for October 15, 1927, pp. 567-568, in a review of a memoir on coccidiosis in the willow grouse (*Lagopus lagopus*) by Prof. August Brinkmann. The memoir forms Communication No. 16 of a comprehensive investigation of the biology of the grouse undertaken by the Bergen Shooting and Fishing Society. We quote from the review:

"In the fluctuations in the stock of willow grouse until the 'nineties, the intervals between the good years were of fairly short duration—a few years only—but the last bad period has extended from the year 1912-13 to the year 1925-26, which suggests that some new factor is exerting an influence. Prof. Brinkmann considers this new factor to be the heavy toll which has been taken of the Norwegian birds of prey. He regards as proved that birds of prey have a favourable effect on the stock of birds, as they take more of the sick than of the healthy birds. One result of the decimation of birds of prey was an enormous increase in the stock of willow grouse which culminated in 1911. But as no attempt was made to preserve the stock by having gamekeepers to collect sick and dead game and to cleanse infected areas by burning the heather—which would have been impossible under Norwegian conditions—the result was a complete collapse of the stock. This was due to a violent epizootic (coccidiosis) which, because the coveys lay very close together in the summer, had exceptionally favourable conditions for development. The epizootic has continued year after year, and it was not checked until the stock had become much reduced. The coveys then lay so far apart during the breeding season that the risk of infection was considerably diminished.

"Coccidiosis appears to be endemic almost wherever grouse are found; Prof. Brinkmann states he has proved its occurrence in Iceland and Spitsbergen. Vervey's view that coccidiosis in different kinds of birds is due to a series of phenotypes of the same parasite, *Eimeria avium,* which can be transferred from one species of bird to another, is in accord with the Norwegian observations that there was coccidiosis simultaneously among willow grouse, ptarmigan, black game, and capercailzie, and that at the time when the epizootic was at its height the small birds also disappeared in various places. On these grounds, Prof. Brinkmann concludes that it would be impossible to exterminate *Eimeria avium.* He recommends less destruction of the birds of prey so as to endeavour to return to the conditions before the 'nineties, when, though there were fluctuations in the stock of willow grouse as great as they are now, the bad periods were of shorter duration."

This report is respectfully referred to our sportsmen's organizations. It confirms conclusions reached by reputable sportsmen-naturalists in America, findings that have been widely disseminated for forty years. Nevertheless our hawks and owls have steadily declined under relentless pursuit. It is not too late for us to profit by a lesson learned by an older country.

Shall we in our treatment of our wild life, avail ourselves of scientific research, or shall we continue in our senseless course of destroying as "vermin" all flesh-eating birds, in the belief that we are thereby practicing conservation?

E. A. P.

FINDING GOOD IN THE YUCCA

BY FRANK THONE

If Dante had ever seen the Mohave desert he would have had a double row of tree yuccas along the path to the infernal gateway. No more diabolical, and useless, plant can be imagined. Bristling and forbidding in appearance, and more than thirty feet in height, it repels man and beast, and rules the desert in stolid unpopularity.

Yet even this monster has been tamed to the service of man, and its usefulness has been found—of all unimaginable places—in the field of surgery. Its trunk is composed, not of straight-grained wood, but of exceedingly tough and strong fibers woven into each other in an irregular and most involved pattern.

Blocks from these trunks are cut into broad, thin sheets with a veneer knife, and these tough, fibrous sheets are used in lieu of splints and casts in setting broken bones. The sheets have about the same happy medium between stiffness and pliability that one finds in good sole leather, and they are in addition very light. They are thus more adaptable than wooden splints, and less liable to break. Except where absolute rigidity is required, they also possess advantages over plaster casts, being many times lighter and permitting easier ventilation.

Although other uses could probably be found for this yucca sheeting, especially in certain kinds of packing cases and in the building of light partitions, the desert region where these trees grow is not large, and any really widespread commercial use of them would very quickly result in their total extermination.

ON THE EDGE OF CALIFORNIA'S DEL NORTE COAST STATE PARK

A 3000-acre tract of giant redwoods bordering the superb Pacific, which the Park Commission, the Save-the-Redwoods League, and Nature-loving citizens purchased at a cost of $400,000. It will be kept in its natural grandeur, untouched

NATURE NEWS and VIEWS

Musk-Oxen for Alaska

The recent arrival in New York of a band of musk-oxen, to be sent to Alaska for study and final liberation, marks an important stage in what promises to be a very interesting experiment. The musk-ox, an animal of former circumpolar distribution, disappeared from Europe and Asia long before historic times. In Alaska it was present in limited numbers until about a century ago. In northern Canada and Greenland it remained in reasonable abundance until modern firearms proved its undoing except in the most remote districts. So at the present time the animal survives only in certain restricted areas in the northern part of the continent, on some of the Arctic Islands, and in northern Greenland.

A few years ago a project to reintroduce musk-oxen in northern Alaska was conceived by the officials of the Biological Survey. That country has vast areas suitable only for denizens of the Arctic, and it is believed that the introduction of this former inhabitant will provide a new resource, and one that will not compete seriously with the existing native species. An appropriation made by Congress during the last session provided for the consummation of this plan. Negotiations with a Norwegian dealer in wild animals resulted in thirty-four musk-oxen of different ages being captured in northeastern Greenland. These were shipped by way of Norway and arrived in New York on September 15.

To comply with the regulations designed to protect American livestock from introduced diseases, the animals must remain in quarantine for a few weeks before starting on the next lap of their long journey. They are now under the eye of L. J. Palmer in charge of the Biological Survey Reindeer Experiment Station near Fairbanks. Mr. Palmer will later accompany the musk-oxen by rail to Seattle, thence by boat to Seward, and again by rail to Fairbanks.

The animals, which include both sexes, range in age from a few months to about three years. They were brought over without loss, and appear to be in excellent physical condition. They are reported to be fairly gentle, considering that they are so recently from the boundless wastes, but some of them are visibly peeved at their narrow traveling quarters. To facilitate handling and care it was necessary to put each in a separate crate.

A few musk-oxen have been kept in Zoological gardens in this country and in Europe, and have lived for several years and in a few cases have produced young. The present shipment, however, represents the first attempt to reintroduce the animals to range where they formerly lived naturally. The outcome of this notable experiment will be watched with great interest.

Bird Strategy

How a flock of partridges outwitted an unsuspecting cat, and by their perfect silence and careful maneuvering avoided what might have been a tragedy, is told by Beatrice Limstrong of Mackeys, North Carolina, who witnessed the incident. A mother bird with her flock was taking an airing when a housecat, ignorant of the prize, came toward them. A cluck, and the youngsters had disappeared as if by magic. The father walked quickly but quietly toward the feline and watched carefully. Finally the cat stopped, still unaware of the birds, lay down for a short time, and returned to the house. As soon as she had disappeared, the father went back to his family, the mother clucked again, and the children came forth from hiding. Miss Limstrong writes: "No human family could have shown greater presence of mind, greater loyalty, or a more perfect plan of action in the face of a suddenly approaching enemy,—the father placing himself between the enemy and his loved ones; the mother, first hiding the young, then keeping watch with the father; the instant obedience of the young, who remained hidden and quiet until called by the parents."

Billboard Stand Stated

Reaffirmation of the attitude of the General Federation of Women's Clubs on the question of billboard restriction is contained in a statement of the incoming chairman of the committee in charge of this activity, who says:

"We shall continue in this Biennial period to make our big objective the complete elimination of the billboards from all but commercial districts. There are three ways of approaching the problem. Already the public opinion of the nation is increasingly directed against the continuance of advertising signs along the highways. Help to increase the momentum by never letting an opportunity pass to condemn these signs. As far as possible carry out the resolution adopted at Swampscott, Massachusetts, in 1929, and give your trade to those firms who do not use the landscape for advertising, giving this reason whenever you buy goods. Protect your natural beauties by wise legislation but be sure it is wise and not subject to question as to its constitutionality."

For "Dudes"

Those visitors to the National Parks who have been dubbed "dudes" and felt properly humble thereafter may take solace from the fact that all persons and forms of action in the parks have distinctive appellations. The lingo of the trail may not be complimentary, but it is at least two-syllable. Here are a few of the types of people and events you saw in Glacier or Yellowstone or one of the other parks:

bubble queen—the girl who washes the dishes.

cheap help—the girls and boys who work at the chalets, camps and hotels. The term, far from derogatory, describes the willingness of these people, most of them college students, to work for little stipend as long as they are in the parks.

dude—you and I and all the rest who go in by train, whether for the first or fiftieth time.

gear-jammer—a bus-driver, delighting in the cacophony of shifting gears and the thrills of hairpin curves.

jingler—the cowboy who has to rout out the horses for the "dudes" about five in the morning.

pack-rat—a bellhop, or the boy who brings hot water in a pitcher and wakes you at six-thirty in the morning.

pack-rats' nest—where the pack-rats sleep.

picking moon lilies—all-inclusive term for walks, talks, boat rides, etc., on which men, dudes or otherwise, take girls. See rotten logging.

pillow-puncher—a chambermaid.

posey-picker—a member of the Ranger-Naturalist Service; also, in Glacier National Park, a member of an American Nature Association party.

rotten logging—all-inclusive term for walks, talks, boat rides, etc., taken by girls in the company of men. The feminine of "picking moon lilies."

sage-brusher—a visitor who comes in his own car, whether Rolls Royce, Ford or motorcycle.

wrangler—or "dude"-wrangler—a guide in charge of a party of "dudes", who leads them over the trails and tells stories about them after they are back East.

A Museum of Note

Flagg Science Museum, the only museum in the country organized and conducted by boys fourteen years of age or younger, is growing rapidly. It has eighty-odd exhibits in its quarters, a bi-weekly publication, *The Informer,* which is constantly increasing its circulation, and an alert staff that is attracting interest in the museum far beyond the bounds of Scarsdale, New York, its home. Its purpose, as related by a neatly printed handbill, is: "To entertain and instruct visitors, and to teach the people working with us how to do the jobs they are doing through actual experience." Its main needs, in common with all museums, are more specimens, which will be appreciated whether loaned or given outright. The museum, located at 9 Windmill Road, Scarsdale, is open to visitors Sunday afternoon, or at special times by appointment with the Director, Myron Read. Interested individuals are cordially invited to become associates of the Museum, and to send their names for receipt of the fortnightly copies of *The Informer.* There are no membership or subscription fees, although, since "workers cannot work without apparatus, and apparatus costs money," contributions will be highly appreciated. We strongly advise everyone to send for at least one copy of *The Informer.*

Novel Suet Stands

Miss Luelle L. Meinke of Minneapolis, Minnesota, has tried out successfully a new type of feeding station, which consists of suet poured into the interstices of the rough bark of trees and allowed to harden. She has found that nuthatches and woodpeckers are especially fond of the suet, and other birds probably take it, as much more disappeared this winter than these two species accounted for. She has also found that chickadees are attracted to suet tied in large chunks to the smaller low-hanging branches with enough string practically to cover the suet. Another method used has been to press bits of the same food in crevices in the bark. Miss Meinke reports that the birds are rapidly getting accustomed to the novel methods of feeding.

Edited by

ELEANOR WALKER

Mexico

One cannot be overemphatic in urging those who go to the Caribbean this winter to extend their tour to include Mexico. Mexico used to remind most of us of bandits holding up a passenger train or revolutionists scattering blood. But today the same word brings up pictures of snow-capped mountain peaks, their bases swathed in purple—blueish mists; of wide stretches of golden sand, cacti-studded; of market-bound, bronze-skinned Indian girls, ear-ringed and be-necklaced, carrying on their heads broadly spreading calabashes filled with brilliant and fragrant flowers; of greenish silver lagoons in the jungle river where, motionless as time, stand crimson flamingoes, blue herons, or white egrets; of gorgeous butterflies, many-hued and as big as one's hand; of the grass-grown ruins of pagan temples, built by an ancient and remarkable Indian civilization, or the crumbling walls of the Catholic convents and missions, erected by the later Spanish régime.

The same charm word, Mexico, will conjure up in one's mind, as lovely sounds as sights:—the pat, pat, pat of the Mexican woman's hands making tortillas, the corn cake which has been the mainstay of the Mexican meal since the days of the Aztecs; the drone of the iridescent humming birds on the flor de mayo trees, literally thousands at one time; the whizzing swish of the pelican as he strikes the river in a speedy dive, in search for a trunkful of fish to feed the young; the early morning chorus of the raven-like chacalacas, the later cries still more monotonous of the city venders of hot cakes or woven mats, or the evening cadences, soft but rarely ecstatic, of the Mexican serenaders.

Is any memory more potent than a particular fragrance, such as that of steaming chocolate, cinnamon tinted, made as only a Mexican can make it, of freshly ground beans, gathered from his native cacao tree; or banana plantations, a strong and pungent odor; or of *pulque,* that most ancient of all Mexican nationalisms, a liquor fermented from the sap of the maguey (cactus)? Kaleidoscopic images, these.

Mexico is primarily an Indian country, in spite of the Spanish domination begun over four hundred years ago. Today the white population, even at a conservative estimate, constitutes less than eight per cent of the country's total. The rest are full-blooded Indians or Mestizos, a mixture of white and Indian. The story of the Spanish conquest and subjugation of the Indians is too long to be sketched here, but a traveler to Mexico should be thoroughly familiar with it. Ernest Gruening's "Mexico" is an excellent study of Mexico today. Prescott treats of the "Conquest," Phillip Russell's "Red Tiger" specializes on Yucatan, and Madame Calderón de la Barca's "Life in Mexico" is a delightful picture of Mexico in the 1840's.

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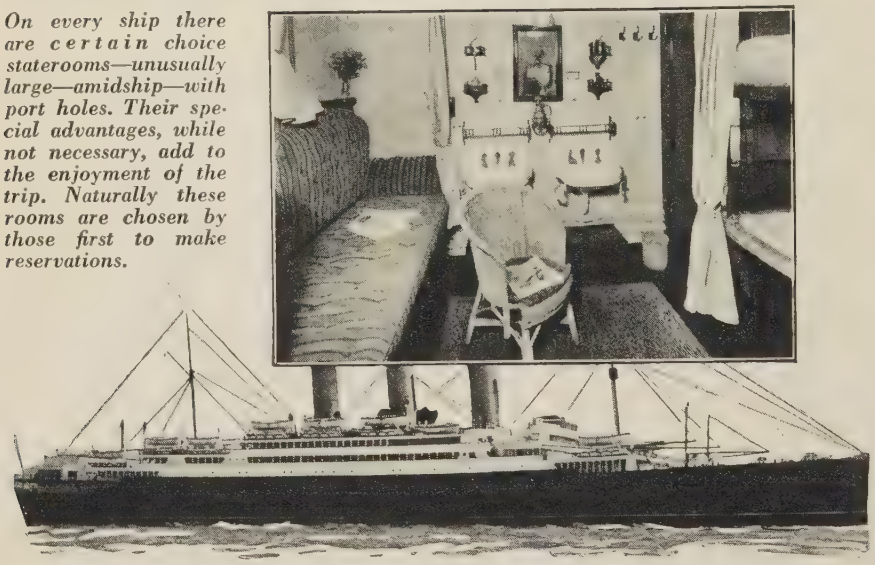

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She was the wife of the Spanish Ambassador, and her delightful letters describe many conditions which still prevail.

In fact, many of the Indian tribes live today almost exactly as in pre-conquest days. Geographically, the innumerable tribes have much the same locations; and now, even as then, the degree of civilization varies greatly from the white-robed, clean and well-behaved Mayans of the Yucatan to the primitive semi-naked Seris of Tiburon Island in the Gulf of California. The clothes, the type of hut, the customs vary from tribe to tribe. But there are certain nationalisms which they share from time immemorial, such as pulque to drink and tortillas to eat; straw sombreros to keep the sun off man's head, and sarapes, or blankets to keep the cold off his back; intricately embroidered huipils, or sleeveless mantles for the women, and a cover-all fringed wrap, called rebozo which she still uses to veil her face from curious eyes. All of these universally worn garments have their local versions. If a man's sarape is sky blue and white with a design of swasticas and geometrical figures through it, he is from Texcoco; if it has pinks, yellows and greens concentric about an idol, he hails from Oaxaca, if dark blue and gray from Tlaxcala; or crimson and black from Leon, and so on.

Today as centuries ago the Mexican woman still places her market products on the pavement and squats beside them; and while her husband squanders pesos at a nearby pulque cantina, she gathers in a few centavos profit. Of all her wares, oranges in neat piles, purplish avocados, woven baskets of all sizes and shapes, bowls, pitchers, plates and vases, you will probably be most entranced by the vividly colored pottery. Metallic green and black from Michoacan, creamy dishes splashed with yellow or green or blue or purple from Oaxaca, black bowls from Zapotecs across which rises a white flight of birds,—you long for a carload. Incidentally, if you happen to meet a market-bound Indian, and wish to buy on the spot, you'll find him refusing to sell at any price, though it be three times its usual value. He loves his market-day far too well to get rid of his wares by the roadside.

But if the people of Mexico are colorful —their setting is equally picturesque and varied. Two great mountain ranges traverse Mexico its entire length from north to south, one somewhat back from the western coast, the other from the eastern. The narrow strips between the coasts and the foothills constitute the tropics or "hot country." Sections, also, of the Yucatan peninsula are tropical. Within these two ranges stretches the great Mexican plateau, as high as eight thousand feet in central Mexico, sloping down at the ends to seven hundred feet in the south and three thousand in the north. The surrounding mountains climb on up, as much as ten thousand feet higher than the plateau. These glorious Sierras are often gashed by deep valleys, called barrancas; and since early days, the wild mountain beauty of Mexico's barrancas has been far famed. The most widely advertised are on the route from Vera Cruz to Mexico City (which is one of the loveliest trips in North America), but the most gorgeous barrancas are in the northern mountains. At the bottom of Barranca de Cobre in Chihuahua, is a river bordered by masses of tropical trees with gay blossoms, by brilliant flowers, scarlet and orange; as the copper cliffs rise

bare-backed out of the gorge, shades of bronze, green, yellow and blue glint in the sun. In still others are found the ruins of ancient cliff-dwellers.

The mountains, too, have their own gigantic beauties. Forty miles southeast of Mexico City, eternally regal against the sky, stand Mexico's well known snow-capped volcanoes, Popocatepetl, and Ixtaccihuatl, both around seventeen thousand feet above the sea. Halfway between Mexico City and Vera Cruz, a volcano called Malinche reminds Indians forever of their lovely princess sometimes called Dona Marina, given away to Cortes, and on the border line between Puebla and Mexico rises Orizaba, except for Mt. McKinley in Alaska, the highest mountain peak in North America.

For either the naturalist or the casual traveler, Yucatan is one of the most interesting parts of Mexico. The Temple of Warriors and a Thousand Columns, the House of Nuns, and the Temple of Jaguars all at Chichen-Itza, testify to the notable culture of the remote ancestors of the present-day Mayans.

In Yucatan, too, you may cast your glance across vast henequin ranches where elaborate machinery transforms cactus plants into rope; you may eat a custardy fruit from a tree called zapote, still more famous for its chicle, from which gum is made; you may frequent streams swarming with alligators, or beaches inhabited by huge turtles; or you may bask in the sun on the shore and watch iguanas doing the same.

Perhaps your young nephews, too, will hoot when you tell them of the jewelled firefly of southern Mexico, scientifically known as *Elateridae*. It carries in its rear two greenish eyes that throw beams so strong, you can read a newspaper by them on the blackest night. Boys sometimes imprison a few of them in a cage made of split cane and use as a lantern. Indian maidens look weirdly decorative wearing them in their hair in the evening. Or they may like to hear how an army of leaf-cutting ants will cut a whole orchard to pieces unless stopped by fire or water, storing the leaves away to ferment into a delectable food for themselves and their young. Sometimes a horde of ants, marching in regular army formations, will attack and exterminate a wasp colony.

Of nature's tropical idiosyncrasies, one of the strangest is a cone-shaped tree, almost bare of leaves, but dotted at the top with long pods, shining green in color. Here green parakeets find refuge from the hawks, nature's camouflage making the birds and the pods indistinguishable.

The parakeet is only one of Yucatan's hundreds of birds. The "Thousand Islands" off the north coast are the landing fields for cranes, pelicans, cormorants, herons, egrets, ibises, flamingoes of every tint from rose to scarlet and legions of other birds. The islands themselves are unique, almost purely a crustacean growth, built by the piling up of the bodies of billions and billions of tiny shellfish. The wind and the birds, bringing seeds and roots, covered them with vegetation.

Another Yucatan miracle is for a native ocean guide to reach over the boat and draw up for you a drink of fresh water. The secret is that Yucatan's underground rivers frequently spout up into the sea and the native can tell the fresh water from the salt by the color.

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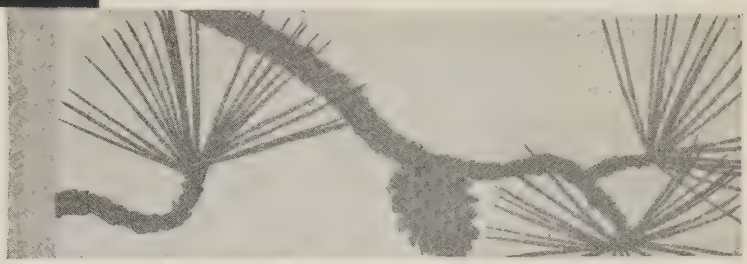

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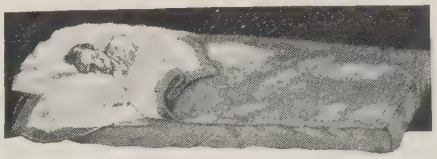

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WHAT ABOUT THIS HORSELESS AGE?

(Continued from page 290)

chestnut or bay in color. Their muzzle is small, the forehead wide and the eye prominent, giving a spirited intelligent front. The character which even an amateur reads in a Thoroughbred head is marked in the breed—speed, never-failing endurance and a gentle, if sometimes a nervous, hot-blooded and almost super-sensitive, disposition. Every breed of light horse developed in the United States carries the blood of early day Thoroughbred sires, the founders of a mighty line of horses.

The Standardbred or American Trotter, from whose ranks come the trotters and pacers of our harness races and most of the light buggy horses of a few years back, is a cross of Thoroughbred on native American mares. As the name implies the standardbred stud register was established on a basis of speed, admitting horses that could trot a mile in 2:30 or faster, and pacers that could go a mile in 2:25. The progeny of such horses, as well as the parents of horses with certain speed were also admitted. Most of these horses are descended from one of three imported sires—Messenger, a gray Thoroughbred; Diomed, also a Thoroughbred; or Bellfounder, a bay trotter from Norfolk, England. This last horse was known to trot seventeen miles in one hour.

Speed at the trot so emphasizes extension in action that these horses have not the easy gait generally desired in saddlers. Since the coming of the automobile they have been bred mainly for the racetrack. The Standardbred is often accused of being plain or homely; beside the Thoroughbred and others their head may be a little heavy, the neck lacking crest, and the gait more marked by speed than smoothness, but such trotters as Guy Axworthy, Peter Volo, or Guy McKinney are wonderful examples of equine beauty. This last named, a yearling son of the first, was sold for $15,000 in 1929—a record for trotters of that age.

Those stout little bay horses of New England, the Morgans, generally considered the fastest for a quarter mile and the stoutest little general-purpose horse known, all descended from one sire, Justin Morgan. Son of a Thoroughbred father, True Briton, and a mother probably carrying Thoroughbred and Arab blood, this remarkable horse was born near Springfield, Mass. He took his name from a modest Vermont school teacher who owned him most of his life. The Morgan, often called a family of the Standardbred, waned in popularity with the advent of the motor car, but he is of value in crossing to produce saddle horses and is still bred in a few establishments. At Middlebury, Vermont, the United States Morgan Horse farm still tries to improve the breed which was pronounced perfect by its admirers twenty years ago.

The third American accomplishment in horse breeding is the American Saddler, product of Thoroughbred sires on pacing or ambling mares, many of which belonged to the now extinct race of Narragansett pacers which in turn descended from a Thoroughbred sire. This product of the bluegrass of Kentucky, Tennessee and Virginia is the horse seen as a gaited saddle horse at society horse shows. With natural fore-

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IF you read "The Story of Anesthesia" by Dr. John H. Evans in the November issue of HYGEIA, the Health Magazine, you may pause at the tale about the above bill and say, "Them was the good old days." But that first rude experiment is a far cry from the perfected science of anesthesia as surgeons administer it today. At some time in your own life, either because of an operation on yourself, a member of your family or a friend, you will be personally interested in some kind of anesthesia. Read Dr. Evans' story of ether and laughing gas in the "good old days". Let him tell you about the wonderful development of perfected anesthetics in "these still better days". Let him put you right regarding the various kinds of anesthesia.

"PHYSICAL ILLITERACY" what is it?

Do you get your exercise listening to the baseball reports over the radio or sitting in the bleachers watching a football game? This form of exercise is so common to all Americans that it has been given a name— "Physical Illiteracy". Dr. J. E. Rogers points out the grave danger of physical illiteracy upon your individual health, the health of your family, community and country. Read this article in the November HYGEIA.

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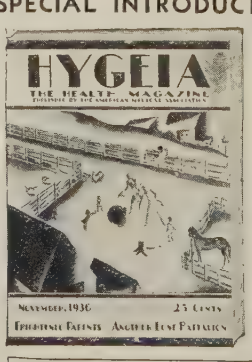

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lock, full tail and flowing mane he is a remarkably beautiful beast whether at the walk, trot, canter, his slow gait or at the rack. Higher of head carriage, often longer of back, rounder of body and perhaps smoother in makeup than the usual Thoroughbred, the American Saddler can easily claim to be America's premier accomplishment in breed building.

Many of the breed, however, are used, like the Thoroughbred and his crosses, as a plain gaited, or as a walk-trot-canter horse. When shown as such they have, of course, their forelock trimmed, their mane haved and the upper part of the tail trimmed down.

Contemporary with the Thoroughbred, and carrying in their veins some Thoroughbred crosses, the Hackney stands as easily peer of the heavy harness coaching world as does the Thoroughbred in the racing, hunting and utility saddle fields. Descended from the Norfolk trotter and taking the name which originally meant "trotter", this breed, because of beauty in harness, and usefulness under saddle and in cross-breeding for hunters and saddlers, has not lost ground. Hackneys are horse or pony as they surpass or fail to reach the height of 14:2, or 14 hands 2 inches, or 58 inches. The intelligence of a good Hackney face, the beauty of their high flashy action and the spirit and verve of their manner may be equalled but not surpassed in the equine world. The shoulder conformation which permits their park action gives a freedom to the forehand and Hackneys are natural jumpers, a fact turned to account in breeding hunters, whose popularity is constantly increasing.

In the founding of all these breeds the Arab, that incomparable horse of the desert, had an important part. His centuries of purebreeding gave him a genetic homogeneity which was of great value in crossing on other stocks. For the desert he was, and is, well-nigh perfect, but the Thoroughbred is larger, swifter and at least as hardy and gentle; the American Saddler is almost if not fully as beautiful and has smoother gaits. On the estates of a few wealthy men the Arab is bred in the United States and he is a valuable even though minor part of our horse population.

No other domesticated animal is probably the subject of more erroneous information. It is popular opinion that the Arab is usually white. It is true many of the first imported Arabs were gray or white which may possibly be because the desert chiefs do not like a white horse. Of twenty-nine Arabs owned by the United States Remount Service in 1928 there were seventeen chestnuts, seven bays, three grays, one sorrel and one brown.

It must not be thought that the saddle horses of the country are all purebred of these breeds. Crosses, with Thoroughbred blood predominating, are as common as the purebreds and often as beautiful and as valuable for riding. The diminutive Shetland pony, the hardy Welsh pony, and at times the western broncho or some one of the heavy draft breeds have a place in the ancestry of truly worthy saddle beasts. Be the ancestry of the horses whatever it will, the lure of the saddle is growing in America.

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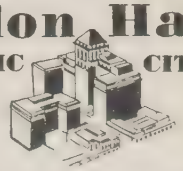

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GET COLOR WITH ASTERS

(Continued from page 303)

forms of our native asters were soon carried to Europe where they attracted considerable attention. European asters are few in number, and only one species is native to the British Isles, so it was natural that American blooms would cause notice. American asters received little attention or appreciation in the New World until the wonderful hybrid products of English and German breeders opened our eyes to the possibilities of the starry tribe.

Two native American species, the New England aster and the New York aster, *Aster novi-belgii,* furnished the main foundation stock upon which the foreign breeders worked, crossing them in many instances with European species. The English origin of these hybrids is indicated by such names as Beauty of Colwall and Mrs. J. F. Raynor, applied to some of our leading varieties, while a touch of the German is revealed by the Heidenrose and Herbstelfe varieties. Under the touch of foreign hands these children of America returned to their native shore with beauty greatly enhanced.

The wild blood of the commonly cultivated species is exposed by the seedlings that frequently develop in aster gardens. These seedlings are worthy of study, since from them new and desirable species may develop.

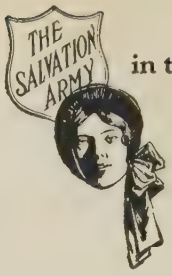
The hardy perennials are true asters, the name aster being derived from a Greek word meaning star, in allusion to the appearance of the blossoms. In England they are variously known at Starworts and Michaelmas daisies.

The hardy asters range in color from pure white to pink, blue, purple and crimson, blending charmingly with vivid autumn foliage hues, untouched and unblemished by cold or rain until late in the season, even after light frosts. They are excellent for perennial borders, to give temporary color to bare spots, in shrubbery plantings, for cut flowers and for roadsides.

The native asters are perhaps the most important of fall garden plants, rivaling chrysanthemums in popularity. And no wonder, since they are of easy culture, resistant to disease and the elements and possess beauty of flower and often of foliage. No one could ask for plants easier to grow than the hardy asters. They develop satisfactorily in almost any soil in open situations, although like most garden plants they repay attention to fertility and respond to general care. Aside from good soil all the asters ask is plenty of water during the summer drought and sufficient room in which to grow. These modest demands are easily met in almost any garden. They are readily started from seed and easily propagated by division of the crowns. The clumps should be divided at least every other year, either during the spring or fall. About six plants per clump are planted six inches apart.

From the New England aster the finest of our tall native species have been developed. They include such fine varieties as Rosea, William Bowman and Lil Fardell, all rose colored, Rubra of reddish hue, Albus, a white flowered form, and Mrs. J. F. Raynor, a tall, brilliant crimson type. Blue and rich violet varieties, all with yellow-centered blossoms, are also available.

Among the best products of the New York aster, closest rival of the New En-



in the United States celebrates this year its Jubilee. Fifty years ago one man and seven lassies landed at the Battery, New York City, the pioneer band of a new evangel. Since that day the organization has steadily advanced to the high place it now occupies in the esteem of the nation. Religion in action is the basis of all its endeavor. No barriers of race, creed or color are recognized.

Every year the Army marks the festive season by giving Christmas dinners to the deserving poor and toys to underprivileged children, in addition to the year-round care of all who seek its aid, temporal or spiritual.

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gland species, may be mentioned Tom Sawyer, ranging from violet to blue with a shrubby growth from four to five feet in height; Beauty of Colwall, a large semi-double lavender to blue creation; Elsie Perry, with small, bright pink blossoms; Burbidge, a pink to lavender form with yellow or brownish centers, and the charming dwarf White Queen that attains a height of two feet or less and is useful for hiding the bare bases of taller growing forms.

Aside from the New England and New York stocks there are a number of other species worthy of any garden. Earliest of perennial asters is the dwarf variety, *Aster alpinus,* which produces blue-purple blooms from early May until mid-June and is particularly useful in rock gardens, although hardy and readily cultivated alone or for edging perennial borders. The white flowered variety of this species, known as var. *albus,* is not highly desirable on account of its comparative lack of vigor. One of the finest of the dwarf asters is var. *bessarabicus* or Bessarabian aster, a graceful variety that produces a profusion of purple petaled, orange centered blossoms particularly attractive in wild flower or natural gardens. The dwarf asters are propagated both by seed and division.

The next bloom in the aster floral procession is *Aster amellus,* a variable type with numerous garden forms. The white forms of this variety are soon spoiled by the browning pappus.

Among the latest types to lend a touch of color to the failing year are the Tartarian Aster, *Aster tataricus,* a huge species six feet in height, and the bushy two foot *Aster grandiflorus* with its blue and violet blossoms and bright yellow eyes.

An excellent low growing species useful for the fronts of borders or for bouquets is *Aster ptarmicoides,* a dainty, freely flowering form one to two feet tall with divided foliage.

There are literally scores of promising wild native species of asters that are practically untouched from a horticultural viewpoint and that offer fine material for the plant breeder who desires to make introductions of merit. There is particular need for more blue garden flowers since desirable blues are scarce and the wild asters offer an almost virgin field that should respond well to the wizardry of cultivation and crossing.

Saving the Commons

An English conservation organization of which the United States may well be proud is the Commons, Open Spaces and Footpaths Preservation Society, whose list of achievements is even longer than its name. The society acts to keep open commons and open spaces, so that the community can enjoy them for recreation and Nature study, and to advise on the management and care of such preserves. It has secured the protection of more than 400,000 acres of Commons, and can point with pride to Epping Forest, Tooting Bec, Wimbledon Commons and other famous public grounds as examples of its work. It acts as arbitrator in rights of way disputes, and has been instrumental in the acquisition of many parks. At the present time, it is in need of money, a year's subscription being 10s. 6d. a year. Its offices are at 71, Eccleston Square, London, S. W. I.

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Helps and Hints
FOR HOME AND GARDEN

PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

DON'T loose interest in your garden at this late season just because the bleak cold days of winter threaten to put an end to its blooming for this year. Your plants must have their rest that they may brighten your garden the better next season. Much root growth is made while the tops are dormant and buds and blossoms continue to develope all through the winter.

The garden maker who is whole heartedly interested in getting results from his plants will still find much outdoor work to do except in the extreme north sections where things are already frozen solid. Where the ground is still open, roses and bulbs may be planted as well as deciduous trees and shrubs. It is rather late to move evergreens. Last month in these columns there were suggestions on planting roses and the necessary protection to bring them through the cold months. There is so much to be gained by fall planting that you should look into the subject fully. Many lilies as well as the spring flowering bulbs may still be planted though it is a bit late to plant narcissus for the best results and the planting of Madonna lilies had better be postponed till next year.

Your lawn will benefit greatly from a top dressing applied at this time. Practically all lawns lack humus, this is one of the reasons they burn out so quickly during hot, dry weather. If you will top dress with the proper mixture once or twice a year for several years, you can help them greatly. Make up a cubic yard of top dressing for each three thousand square feet of lawn. The dressing should be two parts good light loam and one part pulverized peat moss. To each cubic yard of top dressing add ten to fifteen pounds of ammonium sulphate, twenty-five pounds of raw bone meal and fifty pounds of cottonseed meal. Mix the entire lot thoroughly, probably easiest done by passing it through a half inch mesh screen. Spread this evenly over the lawn and

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rake in well, watering it to settle. A top dressing of this nature applied every spring and fall will do wonders in a few years to rejuvenate even the poorest lawn.

If you have been troubled by borers in your garden see that all tops from such things as dahlias, hollyhocks, gladiolus, peonies, iris, delphinium and the like are cut off and burned. You can not be too careful about cleaning up the garden in the fall, as by doing a thorough job you will clean out lots of insect-infested places and prevent their spread next year. You should not burn leaves from the trees as they are part of Nature's plan to replace some of the humus that disappears from the soil each year. If you have no especially prepared place to compost leaves, dig a pit about two feet deep and four or five feet square. Put in a six-inch layer of leaves, then an inch or two of soil, then more leaves and so on. You can make the pile as high as you want to but leave the center depressed so that water may collect there and seep down through the pile. This will aid in rotting it.

It is early to think of the seeds you will start indoors next spring but you should bring in soil and compost now as the ground may be frozen solidly where you need it next spring. The seed flats should be inside where you may go over them during the next few months and see that they are all in good shape. It is well to look over your cold frame or hot-bed frame and see if it needs repair or re-setting. After the ground is frozen it might be difficult to make the necessary repairs.

Be sure your garden does not "freeze dry". With the exceptionally dry summer, unless your section has had copious rains in recent weeks, you must water generously or winter losses may be heavy. Freezing dry is one of the frequent causes of winter killing. See that the soil is moist down at least a foot. This is especially important with newly planted trees and shrubs, both deciduous and evergreen. Rhododendrons and other broad-leaved evergreens need a plentiful supply of water at this season because even when the ground is frozen solidly their broad-leaved surfaces are evaporating moisture.

Do you grow chrysanthemums in your garden? There are many delightful garden varieties and one of the great advantages with them is that there are early and late kinds so that you can accommodate your planting to the frost conditions in your locality. Naturally you wish to have abundant flowers just as late as possible and you should experiment with many different varieties, discarding those which year after year do not bloom because they are caught by the frosts. There are many varieties to choose from, one catalogue lists over one hundred hardy outdoor varieties. Chrysanthemums should of course be planted in the spring.

This is a good time to eradicate any plants of poison ivy or poison sumac that may infest your property. Protect yourself with heavy gauntlet gloves and grub them out. It is best to burn them but be very careful in doing so that you do not stand in or breathe any of the smoke from their burning. Terrible attacks of poisoning can be gotten in this manner. If you can not dig the stumps out it is recommended that dilute sulphuric acid or some crystals of copper sulphate be put upon them. This will usually kill the roots.

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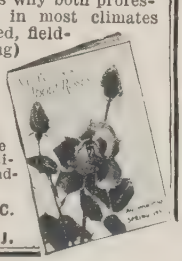

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Before the ground freezes see that all marking stakes are securely driven into the soil. The freezing and thawing of winter may throw them out of the ground and you do not want to loose track of the names of varieties. A garden holds one's interest so much better when every flower and plant is properly named. When your friends admire your choice flowers, if they are properly marked, you are able to tell them just what they are. At this time it would be well to check over all your marking stakes and note those that may have become nearly illegible. During the winter months new stakes can be prepared and the old ones replaced in the spring.

The wintering of dahlias, cannas and tuberous-rooted begonias is always a problem with some gardeners while others never seem to have any trouble at all. Dahlia tubers should be packed with their stems downward that any moisture within them may drain out rather than into them. Doubtless the best way to keep them is packed in peat moss. This may be very slightly moistened and will prevent them from drying and shriveling. If gotten too wet, they may decay or mold. It is wise to examine them about once a month while packed away to see that they are keeping right. They should be kept where they will not freeze and still it must be cold enough to prevent growth.

Cannas are somewhat of a gamble to carry over the winter, especially the newer varieties and many gardeners make no attempt to keep them. Some may be wintered successfully if taken up with a goodly mass of dirt left around them and then packed close together in boxes, filling in with more soil or they may be packed close together upon the cellar floor. If the floor is of concrete there should be a layer of soil or ashes a few inches thick under them.

Tuberous-rooted begonias should be taken up as soon as the tops are blackened by frost and piled somewhere to dry. They must not freeze and should not get wet while thus piled. In two or three weeks the old stems will fall off the tubers and then they may be cleaned, dried some more and put away for the winter. Like dahlias, they

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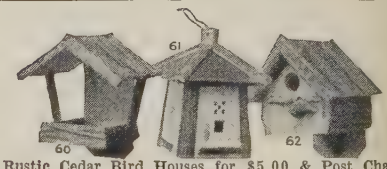

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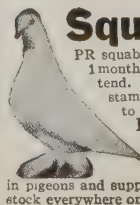

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need to be stored in such a way that they will not dry out and shrivel up or start growth. Peat moss or sand will do nicely to store them in and while they should be kept at a low temperature, they must not freeze.

With all the plants you store for winter, be careful to mark them with their names so that they can be identified when planting time comes. You should be as careful to keep the names of your plant children as you are to know the names of your friends. They are in truth among our best friends and as your garden developes from year to year you will find your interest in it is all the greater if you can recognize each and every plant. Did you ever realize that plants have personalities just like people? Some of them are dependable and steadfast while others are fickle and uncertain. Some are robust and healthy while others are sickly and subject to every passing ailment. One variety may be a gaudy show-off or very course and common while different varieties are dainty and shy. As you come to know and love your flowers, they will disclose to you even more of their secret personalities and you will more fully understand them. Together with this fuller understanding you will be able to minister to them all the better.

WESTERN TRAILS

(Continued from page 296)

without attempting a complicated packing trip. Words are inadequate to describe this southern country and all who have seen it content themselves with advising others to see it for themselves.

So the 1930 trips reaffirmed the fact that there are many people who wish to get more out of the places they visit than the regular tour allows and who appreciate that this can be done best by travelling with a small group, personally-led over a specially-planned route. When we first undertook to provide these trips we little realized what the friendships made on the trail would mean to the members of the parties and to us. They have proved no small proportion of the benefit and joy derived from the trips, and their quality alone would warrant us in going on with this activity.

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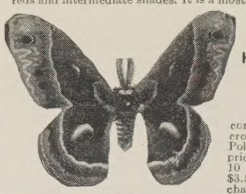

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NIGHT BY A JUNGLE LAGOON

(Continued from page 278)

left hand he grasped a bow and several arrows, and as he stooped forward long black hair fell below his shoulders. I knew then I was looking upon one of that little known, mysterious Caribe tribe, those furtive, almost legendary people so few travelers ever see.

For no other Indian of southern Mexico allows his hair to grow long and to hang loosely about his shoulders. No other Indian wears only a band of stringy burlap-like bark about his waist. Instantly I froze into immobility, screened by my clump of bamboo. Noiselessly the Caribe crept to a point of land not far from where three mallard ducks were swimming lazily about. For a time he disappeared, but came to view again a little farther down. This time he had laid aside his bow and arrow and held some large object about the size of a pumpkin, and about a pumpkin's shape, but darker in color. Again he looked out toward where the ducks were swimming, and I knew vaguely that his plans were laid for their capture. Just how I had no way of guessing.

Slowly he slipped into the water. As it reached his shoulders he put over his head that hollow spherical object, then let himself sink until only that strange headdress was visible above the surface. Slowly, now, this dark harmless looking object floated and drifted about with no definite direction, but always approaching the ducks, still feeding quietly near the bank. It bobbed and moved and stopped and moved again, as naturally as any light object might be blown about by some soft morning breeze, but always with a kind of menacing certainty it approached nearer and nearer to its quarry. Once a duck stopped and turned as if to paddle away, but apparently changing its mind, resumed feeding. The hidden Caribe was only a few feet away, and I found myself straining forward to catch the end.

The end came quickly. The unseen hunter was floating quietly now, directly among the feeding ducks. A hush, almost of expectancy, had fallen. Suddenly a frightened squawk broke the morning silence.

With a terrified flapping of wings one duck arose and sped back into the jungle. The other two were nowhere to be seen! They had been jerked beneath the water's surface as surely and as quickly as if the whole bottom of the lagoon had collapsed. Even from my hiding place I realized that beneath that quietly floating object, two dark hands were grasping the ducks that only a moment before had been feeding in such complete security. In another moment my Caribe had thrown off his camouflage and gained the farther bank, where he stood glistening and streaming with water, holding in either hand the prizes of his hunt. Silently he turned back into the jungle and was gone.

The palms waved as he passed, then grew still again. Nothing seemed changed. The lagoon lay quiet and peaceful as before. The slanting rays of the rising sun were just touching the tallest tops of the jungle trees. Birds were stirring. Another day had come upon the land.

Hungry and weary, an hour later, I was telling Pedro my story. He listened without comment, but as I finished he said quietly, "Give thanks to the Mother of God, *señor*, that the Caribe did not see you. They do not greatly like to be spied upon, those jungle people."

Recompense

The editors of Nature Magazine are compelled to return hundreds of poems of varying merit on the ground that there are other publications better suited to the printing of verse; but occasionally some contributor so whole-heartedly voices his or her inspiration in Nature that exception is made. The following lines in the form of verse were penned by Mrs. Edward L. Hanlon of Sparrowbush, New York:

I have but little money
I haven't any car;
But I know a shady little copse
Where the beautiful violets are.

I may not ever have the price
Of some strange rare perfume;
But in the thicket by the fence
The wild grapes show their bloom.

I own no single painting
With colors rich to see;
But often in the evening sky
God paints rare views for me.

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The American Tree Association stands for a constructive policy of forest protection and extension, to increase appreciation of forests as natural resources essential to the sound economic future of the country.

The Association directs encouragement of tree planting by the public; disseminates popular forestry news for the information of editors of the daily press; and compiles and distributes forestry news and reports on legislative progress for assistance of active foresters in the field.

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GOVERNORS URGE MEMORIAL PLANTING FOR GEORGE WASHINGTON

VIRGINIA, whose lands Washington surveyed as a youth, takes the lead in issuing a call to plant memorial trees to mark the bicentennial of his birth which occurs in 1932. Gov. John Garland Pollard has issued the call and turned the suggestion of the American Tree Association for bicentennial tree planting over to the Landscape Engineers of the State Commission of Conservation and Development. It is fitting indeed that Virginia, "the mother of presidents," and the home of George Washington should take the lead in this phase of the work. Gov. Albert C. Ritchie of Maryland has put the plan before the state bicentennial committee and Gov. Bibb Graves of Alabama has turned the suggestion over to Col. Page Bunker the State Forester. In Arizona Gov. John C. Phillips has called on the people of his state to make their plans while Gov. Harry G. Leslie of Indiana has issued a statement to the people of that state suggesting that they honor George Washington by planting trees.

A remarkable response to the call to plant is being received by the American Tree Association which will send anyone a Bicentennial Tree Planting Book which has tree planting suggestions and a tree-day program outlined. The message has spread from coast to coast and is being taken up by fraternal organizations, civic organizations, women's clubs, Daughters of the American Revolution, the Y. W. C. A., the Rotary Club, Knights of Columbus and patriotic societies.

"A tree in every school-yard to match the American flag" is an idea that is being adopted by thousands of school teachers who are sending for the Tree Planting Book. The tree, a living memorial to George Washington, has a great appeal particularly if the school pupils can have a part in planting it. It is expected the original estimate of 10,000,000 trees will be exceeded greatly. The school teachers are using the tree planting idea also as an object lesson. This is followed by appropriate exercises and essay writing in regard not only to Washington but to the value of trees.

Wherever possible the American Tree Association is urging that the town forest idea be incorporated in the plan for marking the bicentennial. In Grand Rapids, Michigan, a city demonstration forest has been approved by the City Planning Commission and the City Commission. The outline of this project is made by Frank L. DuMond, Curator of Education of the Kent Scientific Museum of that city. Here is the plan:

AIMS: (1) To establish a city demonstration forest area on which children of Grand Rapids may learn to plant trees. (2) To enable Youth to become intimately acquainted with the important forest trees of our state. (3) To provide an outdoor laboratory where trees of various species may demonstrate their ability to grow in Michigan. (4) To develop "tree consciousness" on the part of young and old.

THE PLAN: To work out a desirable planting plan suitable for the creation of a hand-planted forest on 50 acres of old fields of Aman Park. This will require 60,800 trees (if planted at 6 foot intervals, or 1,210 per acre). The trees to be planted in a period of 5 years by setting out 10 acres (12,100 trees) per annum. By utilizing the spring and fall planting seasons, 6,050 could be planted at each of these periods. As the object is to make this plantation of the utmost educational value, each child should be limited to the planting of 25 trees which is sufficient to enable the planter to grasp the technique without tiring. Based on previous contacts made with the children of Grand Rapids through various educational agencies, as the schools, Camp Fire Girls and Boy Scouts, the required number of planters can easily be secured.

COST: The cost of making this "show-window" forest will be almost negligible. Much of the planting stock can be secured free from the State Forester.

CONCLUSION: Approximately 500 children each year will receive practical instruction in reforestation or at the end of the 5-year period a total of 2,500 boys and girls will have an intelligent appreciation of some of the problems involved in restoring Michigan's idle acres to productivity.

Wherever such a plan as outlined can be adopted a Kiwanis Club, a Rotary Club or similar organization will find it well worth while to institute such a community activity and plant town forests.

Editors of the country are unanimous in favoring the suggestion of the American Tree Association and urging that thousands of tree planters register their tree planting on the national honor roll. The Atlanta Journal calls the idea "the happiest suggestion we have seen for the observance in 1932 of the bicentennial of the birth of George Washington." The Michigan City News says that "Ten million trees no matter where planted will form a memorial that will be useful as well as ornamental and permanent. What more could be asked of a memorial?" The Rutland, Vermont, Herald points out that "No more fitting recognition of the two-hundredth anniversary of the birth of George Washington could be given in the planting of ten million trees as proposed by the American Tree Association." In the Urbana Daily Citizen the editor points out that "Planting these trees would serve a double purpose. Not only would the act be a fitting tribute to Washington; it would constitute a vast stride along the difficult path leading to national reforestation."

TREES FOR WASHINGTON

Detroit News—Ten million trees planted this year in honor of George Washington. That is the proposal of the American Tree Association as a fitting recognition of the 200th anniversary of the birth of the Father of his country, which occurs in February, 1932. The enterprise is quite in the spirit manifested by Washington; doubtless he would be more pleased by the success of such an undertaking than by the erection of statues and monuments and holding ephemeral expositions.

Atlanta Journal—The happiest suggestion we have seen for the observance in 1932 of the bicentennial of the birth of George Washington comes from the American Tree Association. Every commonwealth, country and town, every neighborhood, school and home, as well as numberless individuals, can have a creative part. And when the gracious labor is finished, America will be nearer what Washington would wish it to be.

Charlotte Observer—It is a suggestion, one that we trust will be acted upon by people from Florida to Washington State, and from rock-bound Maine to the golden slopes of California. No gift of word or thought, no graven stone or exalted monument of enduring granite on the highest hill could so adequately express the man that was Washington so well as a tree.

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